

L^AT_EX Class for *Association for Computing Machinery**

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Abstract

This package provides a class for typesetting publications of Association for Computing Machinery.

Contents

1	Introduction	3
2	User's guide	3
2.1	Installation	3
2.2	Invocation and options	5
2.3	Topmatter commands	7
2.4	Algorithms	15
2.5	Figures and tables	15
2.6	Theorems	17
2.7	Online-only and offline-only material	17
2.8	Note about anonymous mode	17
2.9	Acknowledgments	18
2.10	Bibliography	19
2.11	Colors	19
2.12	Other notable packages and typographic remarks	19
3	Implementation	20
3.1	Identification	20
3.2	Options	20
3.3	Setting switches	22
3.4	Loading base class and package	23
3.5	Paper size and paragraphing	29

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3.6	Fonts	32
3.7	Floats	33
3.8	Lists	34
3.9	Top matter data	35
3.10	Concepts system	46
3.11	Copyright system	46
3.12	Typesetting top matter	51
3.13	Headers and Footers	64
3.14	Sectioning	68
3.15	Theorems	69
3.16	Acknowledgments	72
3.17	Conditional typesetting	72
3.18	End of Class	73

1 Introduction

Association for Computing Machinery is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession¹. It was one of the early adopters of \TeX for its typesetting.

It provided several different classes for a number of journal and conference proceedings. Unfortunately during the years since these classes were written, the code was patched many times, and the support of the different versions of the classes became difficult.

This package provides the uniform interface for all ACM publications. It is intended to replace all different classes and packages and provide an up to date \LaTeX package.

The package uses only free \TeX packages and fonts included in \TeX Live, Mik \TeX and other popular \TeX distributions. It is intended to be published in these distributions itself, which minimizes users' efforts in the installation and support of the package.

I am grateful to Matthew Fluet, John Owens, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer and many others for their invaluable help.

The development version of the package is available at <https://github.com/borisveytsman/acmart>.

2 User's guide

2.1 Installation

Most probably, you already have this package installed in your favorite \TeX distribution; if not, you may want to upgrade. You may need to upgrade it anyway since the package uses a number relatively recent packages, especially the ones related to the fonts.

If you decide to install the package yourself, follow the standard rules:

1. Run `latex on acmart.ins`. This will produce the file `acmart.cls`.
2. Put the file `acmart.cls` and the bibliography files `*.bst` to the places where \LaTeX can find them (see [1] or the documentation for your \TeX system).
3. Update the database of file names. Again, see [1] or the documentation for your \TeX system for the system-specific details.
4. The file `acmart.pdf` provides the documentation for the package (this is the file you are probably reading now).

As an alternative to items 2 and 3 you can just put the files in the working directory where your `.tex` file is.

The class uses a number of other packages. They are included in all major \TeX distributions (\TeX Live, Mac \TeX , Mik \TeX) of 2015 and later, so you probably have them installed. Just in case here is the list of these packages:

- `amscs`, <http://www.ctan.org/pkg/amscs>

¹<http://www.acm.org/>

- *amsfonts*, <http://www.ctan.org/pkg/amsfonts>
- *amsmath*, <http://www.ctan.org/pkg/amsmath>
- *binhex*, <http://www.ctan.org/pkg/binhex>
- *caption*, <http://www.ctan.org/pkg/caption>
- *comment*, <http://www.ctan.org/pkg/comment>
- *environ*, <http://www.ctan.org/pkg/environ>
- *fancyhdr*, <http://www.ctan.org/pkg/fancyhdr>
- *float*, <http://www.ctan.org/pkg/float>
- *fontaxes*, <http://www.ctan.org/pkg/fontaxes>
- *geometry*, <http://www.ctan.org/pkg/geometry>
- *graphics*, <http://www.ctan.org/pkg/graphics>
- *hyperref*, <http://www.ctan.org/pkg/hyperref>
- *ifluatex*, <http://www.ctan.org/pkg/ifluatex>
- *ifxetex*, <http://www.ctan.org/pkg/ifxetex>
- *inconsolata*, <http://www.ctan.org/pkg/inconsolata>
- *latex-tools*, <http://www.ctan.org/pkg/latex-tools>
- *libertine*, <http://www.ctan.org/pkg/libertine>
- *manyfoot*, <http://www.ctan.org/pkg/manyfoot>
- *microtype*, <http://www.ctan.org/pkg/microtype>
- *ms*, <http://www.ctan.org/pkg/ms>
- *mweights*, <http://www.ctan.org/pkg/mweights>
- *natbib*, <http://www.ctan.org/pkg/natbib>
- *nccfoots*, <http://www.ctan.org/pkg/nccfoots>
- *newtx*, <http://www.ctan.org/pkg/newtx>
- *oberdiek*, <http://www.ctan.org/pkg/oberdiek>
- *pdftex-def*, <http://www.ctan.org/pkg/pdftex-def>
- *setspace*, <http://www.ctan.org/pkg/setspace>
- *totpages*, <http://www.ctan.org/pkg/totpages>

- *trimspaces*, <http://www.ctan.org/pkg/trimspaces>
- *upquote*, <http://www.ctan.org/pkg/upquote>
- *url*, <http://www.ctan.org/pkg/url>
- *xcolor*, <http://www.ctan.org/pkg/xcolor>
- *xkeyval*, <http://www.ctan.org/pkg/xkeyval>

2.2 Invocation and options

To use the class put in the preamble of your document

```
\documentclass[options]{acmart}
```

There are several options corresponding to the type of the document and its general appearance. They are described below. Generally speaking, the options have key=value forms, for example

```
\documentclass[format=acmsmall, screen=true, review=false]{acmart}
```

The option `format` describes the format of the output. There are several possible values for this option, for example,

```
\documentclass[format=acmtog]{acmart}
```

Actually the words `format=` can be omitted, e.g.,

```
\documentclass[acmtog, review=false]{acmart}
```

The possible formats are listed in Table 1. Note that formats starting with `acm` are intended for journals and transactions, while formats starting with `sig` are intended for proceedings published as books.

There are several Boolean options which can take true or false values. They are listed in Table 2. The words `=true` can be omitted when setting the Boolean option, so instead of `screen=true` one can write just `screen`, for example,

```
\documentclass[acmsmall, screen, review]{acmart}
```

The option `review` is useful when combined with the `manuscript` format option: it provides a version suitable for reviewers and copyeditors.

The option `screen` may in the future involve additional features suitable for on-screen versions of the articles.

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.10.

The option `anonymous` is used for anonymous review process: all author information becomes obscured.

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default
acmsmall	Small single column format, used for CIE, CSUR, JACM, JDIQ, JEA, JERIC, JETC, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TEAC, TECS, TIIS, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRET, TSAS, TSC, TSLP, TWEB.
acmlarge	Large single column format, used for JOCCH, TAP
acmtog	Large double column format, used for TOG
sigconf	Proceedings format for most of ACM conferences (with the exceptions listed below)
siggraph	Proceedings format for SIGGRAPH and SIGGRAPH Asia conferences, published in ACM Transactions on Graphics journal issues
sigplan	Proceedings format for SIGPLAN conferences
sigchi	Proceedings format for SIGCHI conferences
sigchi-a	Format for SIGCHI extended abstract

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered, hyperlinks are colored
screen	false	A screen version: hyperlinks are colored
natbib	true	Whether to use natbib package (see Section 2.10)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for authors' personal use or posting (see Section 2.3)

2.3 Topmatter commands

A number of commands set up *top matter* information, or, in the computer science jargon, *metadata* for the article. They establish the publication name, article title, authors, doi and other data. Some of these commands, like `\title` or `\author`, should be put by the authors. Others, like `\acmVolume` or `\acmDOI`—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the `\maketitle` command. Note that in the previous versions of ACM classes some of these commands should be used before `\maketitle`, and some after it. Now they all must be used before `\maketitle`.

The class internally loads `amsart` class, so many top matter commands are inherited from `amsart` [2].

`\acmJournal` The macro `\acmJournal{<shortName>}` sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication *in uppercase*, for example,

```
\acmJournal{TOMS}
```

The currently recognized journals are listed in Table 3. Note that conference proceedings published in *book* form do not set this macro.

It is expected that this command is inserted by the author of the manuscript when she decides to which journal to submit the manuscript.

`\acmConference` The macro `\acmConference[<short name>]{<name>}{<date>}{<venue>}` is used for conference proceedings published in the book form. The arguments are the following:

short name: the abbreviated name of the conference (optional).

name: the name of the conference *or* the name of the book as set by the editor.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

```
\acmConference[TD'15]{Technical Data Conference}{November
12--16}{Dallas, TX, USA}
\acmConference{SA'15 Art Papers}{November 02--06, 2015}{Kobe, Japan}
```

Normally this command is entered either by the editor or by the typesetter.

`\title` The command `\title`, as in `amsart` class, has two arguments: one optional, and one mandatory:

```
\title[<ShortTitle>]{<FullTitle>}
```

The mandatory argument is the full title of the article. The optional argument, if present, defines the shorter version of the title for running heads. If the optional argument is absent, the full title is used instead.

It is expected that this command is inserted by the author of the manuscript.

Table 3: ACM publications and arguments of the \acmJournal command

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TIIS	ACM Transactions on Interactive Intelligent Systems
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

`\subtitle` Besides title, ACM classes allow subtitle, set with the `\subtitle{<subtitle>}` macro. The commands for specification of authors are highly structured. The reason is, they serve double duty: the authors' information is typeset in the manuscript, *and* is used by the metadata extraction tools for indexing and cataloguing. Therefore it is very important to follow the guidelines exactly.

`\author` The basic commands are `\author`, `\orcid` (for the researchers registered with ORCID, <http://www.orcid.org/>), `\affiliation` and `\email`. In the simplest case you enter them in this order:

`\orcid`

`\affiliation`

`\email`

```

\author{...}
\orcid{...}
\affiliation{...}
\email{...}

```

Do *not* use \LaTeX `\and` macro! Each author deserves his or her own `\author` command.

Note that some formats do not typeset e-mails of ORCID identifiers. Do not worry: metadata tools will get them.

Sometimes an author has several affiliations. In this case the `\affiliation` command should be repeated:

```

\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}

```

Similarly you can repeat `\email` command.

You may have several authors with the same affiliation, different affiliations or overlapping affiliations (author A_1 is affiliated with institutions I_1 and I_2 , while author A_2 is affiliated with I_2 only, and author A_3 is affiliated with I_1 and I_3 , ...). The recommended solution is to put the `\affiliation` commands after each author, possibly repeating them:

```

\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}

```

In some cases when several authors share the same affiliation you may try to save the space using the format

```
\author{...}
\email{...}
\author{...}
\email{...}
\affiliation{...}
```

However, this format is not generally recommended.

<pre>\position \institution \department \streetaddress \city \state \postcode \country</pre>	<p>The <code>\affiliation</code> command is further structured to interact with the metadata extraction tools. Inside the this command you should use <code>\position</code>, <code>\institution</code>, <code>\department</code>, <code>\city</code>, <code>\streetaddress</code>, <code>\state</code>, <code>\postcode</code> and <code>\country</code> macros to indicate the corresponding parts of the affiliation. Note that in some cases (for example, journals) these parts are not printed in the resulting copy, but they <i>are</i> necessary since they are used by the XML metadata extraction programs. Do <i>not</i> put commas or <code>\\</code> between the elements of <code>\affiliation</code>: they will be provided automatically.</p> <p>An example of the author block:</p>
--	---

```
\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
  \department{School of Biomedical Engineering}
  \streetaddress{Samuels Building (F25), Kensington Campus}
  \city{Sydney}
  \state{NSW}
  \postcode{2052}
  \country{Australia}}
\email{author@nsw.au.edu}
\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sydney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sydney}
  \state{NSW}
  \country{Australia}}
```

Note that old ACM conference formats did not allow for more than six authors and required some efforts from the authors to achieve alignment. The new format is much better in this.

It is expected that these commands are inserted by the author of the manuscript.

`\thanks` Like `amsart` (and unlike standard \TeX), we allow `\thanks` only *outside* of commands `\title` and `\author`. Example:

```
\thanks{This work is supported by the Widget Corporation Grant
\#312-001.\\
Author's address: D. Pineo, Kingsbury Hall, 33 Academic Way, Durham,
N.H. 03824; email: dspineo@comcast.net; Colin Ware, Jere A. Chase
Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824; email:
cware@ccom.unh.edu;
Sean Fogarty, (Current address) NASA Ames Research Center, Moffett
Field, California 94035.}
```

It is expected that this command is inserted by the author of the manuscript.

`\titlenote` While the command `\thanks` generates a note without footnote mark, sometimes
`\subtitlenote` the authors might need notes more tightly connected to the title, subtitle or author. The
`\authornote` commands `\titlenote`, `\subtitlenote` and `\authornote` that follow the corresponding
commands (`\title`, `\subtitle` and `\author`) generate such notes, for example

```
\title{This is a title}
\titlenote{This is a titlenote}
\author{A. U. Thor}
\authornote{This is an authornote}
```

`\acmVolume` The macros `\acmVolume`, `\acmNumber`, `\acmArticle`, `\acmYear` and `\acmMonth` are
`\acmNumber` inserted by the editor and set the journal volume, issue, article number, year and month
`\acmArticle` correspondingly. The arguments of all these commands, including `\acmMonth` is numer-
`\acmYear` ical, including `\acmMonth`, for example,
`\acmMonth`

```
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}
```

`\acmArticleSeq` The articles in the same issue of a journal have *sequential number*. It is used to
position black blob in same formats. By default it is the same as article number, but the
command `\acmArticleSeq{<n>}` can be used to change it:

```
\acmArticle{39} % The sequence number will be 39 by default
\acmArticleSeq{5} % We rededine it to 5
```

`\acmPrice` The macro `\acmPrice{<price>}` sets the price for the article (by default 15.00), for

example,

```
\acmPrice{25.00}
```

`\acmISBN` Book-like volumes have ISBN numbers attached to them. The macro `\acmISBN{<ISBN>}` sets it. Normally it is set by the typesetter, for example,

```
\acmISBN{978-1-4503-3916-2}
```

`\acmDOI` The macro `\acmDOI{<DOI>}` sets the DOI number of the article, for example,

```
\acmDOI{10.1145/9999997.9999999}
```

It is normally set by the typesetter.

`\acmBadgerR` Some conference articles get special distinction, for example, the artifact evaluation
`\acmBadgerL` for PPOPP 2016 (see <http://ctuning.org/ae/ppopp2016.html>). These articles display special badges supplied by the conference organizers. The class provides commands to add these badges: `\acmBadgerR[<url>]{<graphics>}` and `\acmBadgerL[<url>]{<graphics>}`. The first command puts the badge to the right of the title, and the second one—to the left. The exception is the sigchi-a mode for SIGCHI Extended abstract, which puts the badges on the left margin. The argument have the following meaning: `[<url>]`, if provided, sets the link to the badge authority in the screen version, while `{<graphics>}` sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

```
\acmBadgerR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}
```

`\startPage` The macro `\startPage{<page>}` sets the first page of the article in the journal or book. It is used by the typesetter.

`\terms` The macros `\terms{<term, term,...>}` and `\keywords{<keyword, keyword,...>}` set
`\keywords` the main terms and the additional keywords for the article. Term and keywords must be separated by commas, for example,

```
\terms{wireless, interference}  
\keywords{wireless sensor networks, media access control,  
multi-channel, radio interference, time synchronization}
```

`CCSXML` ACM publications are classified according to the ACM Computing Classification
`\ccsdesc` Scheme (CCS). CCS codes are used both in the typeset version of the publications *and* in the metadata in the various databases. Therefore you need to provide both \TeX commands and XML metadata with the paper.

The tool at <http://dl.acm.org/ccs.cfm> can be used to generate CCS codes. After you select the topics, click on “Generate CCS codes” to get the result like the following:

```
\begin{CCSXML}
```

```

<ccs2012>
  <concept>
    <concept_id>10010520.10010553.10010562</concept_id>
    <concept_desc>Computer systems organization~Embedded systems</concept_desc>
    <concept_significance>500</concept_significance>
  </concept>
  <concept>
    <concept_id>10010520.10010575.10010755</concept_id>
    <concept_desc>Computer systems organization~Redundancy</concept_desc>
    <concept_significance>300</concept_significance>
  </concept>
  <concept>
    <concept_id>10010520.10010553.10010554</concept_id>
    <concept_desc>Computer systems organization~Robotics</concept_desc>
    <concept_significance>100</concept_significance>
  </concept>
  <concept>
    <concept_id>10003033.10003083.10003095</concept_id>
    <concept_desc>Networks~Network reliability</concept_desc>
    <concept_significance>100</concept_significance>
  </concept>
</ccs2012>
\end{CCSXML}

\ccsdesc[500]{Computer systems organization~Embedded systems}
\ccsdesc[300]{Computer systems organization~Redundancy}
\ccsdesc[100]{Computer systems organization~Robotics}
\ccsdesc[100]{Networks~Network reliability}

```

You need to just copy this code and paste it in your paper anywhere before \maketitle.

\setcopyright There are several possibilities for the copyright of the papers published by ACM: the authors may transfer the rights to ACM, license them to ACM, some or all authors might be employees of the US or Canada Government, etc. Accordingly the command \setcopyright{...} is introduced. Its argument is the copyright status of the paper, for example, \setcopyright{acmcopyright}. The possible values for this command are listed in Table 4.

The ACM submission software should generate the right command for you to paste into your file.

\copyrightyear Each copyright statement must have the year of copyright. By default it is the same as \acmYear, but you can override this decision using the macro \copyrightyear, e.g.,

```

\acmYear{2016}
\copyrightyear{2015}

```

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option authorversion=true produces

Table 4: Parameters for `\setcopyright` command

Parameter	Meaning
<code>none</code>	The copyright and permission information is not typeset (this is the option for some ACM conferences).
<code>acmcopyright</code>	The authors transfer the copyright to ACM (the “traditional” choice).
<code>acmlicensed</code>	The authors retain the copyright but license the publication rights to ACM.
<code>rightsretained</code>	The authors retain the copyright and publication rights to themselves or somebody else.
<code>usgov</code>	All the authors are employees of the US Government.
<code>usgovmixed</code>	Some authors are employees of the US Government.
<code>cagov</code>	All the authors are employees of the Canadian Government.
<code>cagovmixed</code>	Some authors are employees of the Canadian Government.

the special form of the copyright statement for this case. Note that you still need the `\setcopyright` command and (optionally) `\copyrightyear` command to tell \TeX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permission blocks for the printed version and authors’ version the page breaks might be different between them.

<code>abstract</code>	The environment <code>abstract</code> must <i>precede</i> <code>\maketitle</code> command. Again, this is different from the standard \LaTeX .
<code>teaserfigure</code>	<p>A special kind of figure is used for many two-column conference proceedings. This figure is placed just after the authors, but before the main text. The environment <code>teaserfigure</code> is used for these figures. This environment must be used <i>before</i> <code>\maketitle</code>, for example,</p> <pre> \begin{teaserfigure} \includegraphics[width=\textwidth]{sampleteaser} \caption{This is a teaser} \label{fig:teaser} \end{teaserfigure} </pre>
<code>\settopmatter</code>	<p>Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You may override these defaults using the command <code>\settopmatter{<settings>}</code>. The settings and their meanings are listed in Table 5. For example,</p> <pre> \settopmatter{printacmref=false, printccs=true, printfolios=true} </pre>
<code>\received</code>	The command <code>\received[<stage>]{<date>}</code> sets the history of the publication. The <code>[<stage>]</code> argument is optional; the default is Received for the first date and revised for the subsequent ones. For example

Table 5: Settings for `\settopmatter` command

Parameter	Values	Meaning
<code>printccs</code>	true/false	Whether to print CCS categories
<code>printacmref</code>	true/false	Whether to print ACM bibliographic entry
<code>printfolios</code>	true/false	Whether to print page numbers (folios)

```
\received{February 2007}
\received[revised]{March 2009}
\received[accepted]{June 2009}
```

`\maketitle` The macro `\maketitle` must be the last command in the top matter group: i.e., it must follow the commands defined in this section.

`\shortauthors` *After* the command `\maketitle` the macro `\shortauthors` stores the names of the authors for the running head. You may redefine it if the list of author’s name is too long, e.g.,

```
\maketitle
\renewcommand{\shortauthors}{Zhou et. al.}
```

2.4 Algorithms

There now several good packages for typesetting algorithms [3, 4, 5], and the authors are now free to choose their favorite one.

2.5 Figures and tables

New ACM styles use the standard \LaTeX interface for figures and tables. There are some important items to be aware of, however.

1. The captions for figures must be entered *after* the figure bodies, and for the tables *before* the table bodies.
2. ACM uses the standard types for figures and types and adds several new ones. In total there are follwing types:

figure, table: a standard figure or table, taking full text width in one-column formats and one column in two-column formats.

figure*, table* in two-column formats, a special figure or table taking full text width.

teaserfigure: a special figure before `\maketitle`.

sidebar, marginfigure, margintable: in the sigchi-a format, special sidebars, tables and figures on the margin.

3. Accordingly, when scaling the images, one should use the following sizes:

- (a) For figure in one-column mode, figure* in two-column mode or teaserfigure— \textwidth (in the one-column you can also use \columnwidth , which coincides with \textwidth in this case).
- (b) For figure in two-column mode— \columnwidth .
- (c) For marginfigure— \marginparwidth .
- (d) For figure* in SIGCHI Extended abstracts— \fulltextwidth .

It is strongly recommended to use the package booktabs [6] and follow its main principles of typography with respect to tables:

- 1. Never, ever use vertical rules.
- 2. Never use double rules.

It is also a good idea not to overuse horizontal rules.

For table *footnotes* you have several options described in TeX FAQ [1]. The simplest one is to use \minipage environment:

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
\toprule
TERRAIN\footnote{This is a table footnote. This is a
    table footnote. This is a table footnote.} &
    (200\,m$\times$200\,m) Square\\
Node Number & 289\\
Node Placement & Uniform\\
Application & Many-to-Many/Gossip CBR Streams\\
Payload Size & 32 bytes\\
Routing Layer & GF\\
MAC Layer & CSMA/MMSN\\
Radio Layer & RADIO-ACCNOISE\\
Radio Bandwidth & 250Kbps\\
Radio Range & 20m--45m\\
\bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
sourcenote. This is a table sourcenote. This is a table
sourcenote.

\emph{Note:} This is a table footnote.
\end{minipage}
\end{table}
```


sidebar SIGCHI extended abstract extensively uses margin space. The package provides
marginfigure three environments for this with option captions:
margintable

sidebar: textual information on the margin

marginfigure: a figure on the margin

margintable: a table on the margin

Tables and figures (including margin tables and margin figures) are by default centered. However, in some cases (for example, when you use several subimages per figure) you may need to override this decision. A good way to do so is to put the contents into a `\minipage` of the width `\columnwidth`.

2.6 Theorems

ACM classes define two theorem styles and several pre-defined theorem environments:

acmplain: this is the style used for theorem, conjecture, proposition, lemma, corollary, and

acmdefinition: this is the style used for example and definition.

2.7 Online-only and offline-only material

`printonly` Some supplementary material in ACM publication is put online, but not in the printed
`screenonly` version. The text inside the environment `screenonly` will be typeset only when the option `screen` (see Section 2.2) is set to true. Conversely, the text inside the environment `printonly` is typeset only when this option is set to false. For example

```
\section{Supplementary materials}

\begin{printonly}
  This section is included in the online version of the paper.
\end{printonly}

\begin{screenonly}
  (The actual section).
\end{screenonly}
```

We use *comment* package for typesetting this code, so `\begin` and `\end` should start at the first positions of the lines of their own (no initial spaces etc.).

2.8 Note about anonymous mode

anonsuppress	When the option <code>anonymous</code> is selected, \TeX suppresses author information (including number of authors) for a blind review. However, sometimes the information identifying the authors may be present in the body of the paper
--------------	---

```

\begin{anonsuppress}
  This is the continuation of the previous work by the author
  \cite{prev1, prev2}.
\end{anonsuppress}

```

As for `printonly` and `screenonly` environments, `\begin{anonsuppress}` and `\end{anonsuppress}` should start the line of their own (no leading or trailing spaces).

2.9 Acknowledgments

The traditional “Acknowledgments” section is conventionally used to thank persons and granting agencies for their help and support. However, there are several important considerations about this section.

First, in the anonymous mode this section must be omitted: it gives too much information to the reviewers. Second, the data about the grants is extracted and stored separately by the postprocessing software. ACM classes provide facilities for both these tasks.

`acks` The environment `acks` starts an unnumbered section “Acknowledgments” unless the anonymous mode is chosen. Put all thanks inside this environment.

As for `printonly` and `screenonly` environments, `\begin{acks}` and `\end{acks}` should start the line of their own (no leading or trailing spaces).

`\grantsponsor` All the financial support *must* be listed using the commands `\grantsponsor` and
`\grantnum` `\grantnum`. These commands tell the postprocessing software about the granting organization and the grant. The format of the command is the following:

```

\grantsponsor{\<sponsorID>}{\<name>}{\<url>}
\grantnum[\<url>]{\<sponsorID>}{\<number>}.

```

Here `{\<sponsorID>}` is the unique ID used to match grants to sponsors, `{\<name>}` is the name of the sponsor, `{\<url>}` is its URL, and `{\<number>}` is the grant number. The `{\<sponsorID>}` of the `\grantnum` command must correspond to `\sponsorID` of a `\grantsponsor` command. Some awards have their own web pages, which you can include using the optional argument of `\grantnum` command.

Example:

```

\begin{acks}
  The authors would like to thank Dr. Yuhua Li for providing the
  matlab code of the \textit{BEPS} method.

  The authors would also like to thank the anonymous referees for
  their valuable comments and helpful suggestions. The work is
  supported by the \grantsponsor{GS501100001809}{National Natural
  Science Foundation of
  China}{http://dx.doi.org/10.13039/501100001809} under Grant
  No.:~\grantnum{GS501100001809}{61273304}
  and~\grantnum[http://www.nnsf.cn/youngscientists]{GS501100001809}{Young
  Scientists' Support Program}.
\end{acks}

```

2.10 Bibliography

ACM uses *natbib* package for formatting of referencing and the style `ACM-Reference-Format.bst` for Bib_T_EX processing. You may disable loading of *natbib* by using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of Bib_T_EX styles other than `ACM-Reference-Format.bst`, and may delay the processing of the manuscript.

`\citestyle` If you use *natbib*, you can select one of two predefined citation styles: the author-year format `acmauthoryear` or the numeric format `acmnumeric` using the command `\citestyle`, for example,

```
\citestyle{acmauthoryear}
```

Note that numeric citations are the default mode for most formats.

`\setcitestyle` You may further customize *natbib* using `\setcitestyle` command, for example,

```
\setcitestyle{numbers,sort&compress}
```

If you use *natbib*, then commands like `\citep` and `\citeauthor` are automatically supported.

2.11 Colors

While printed ACM publications are usually black and white, screen mode allows the use of colors. The ACM classes pre-define several colors according to [7]: `ACMBlue`, `ACMYellow`, `ACMOrange`, `ACMRed`, `ACMLightBlue`, `ACMGreen`, `ACMPurple`, `ACMDarkBlue`. You can use them in the color assignments.

2.12 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package *subcaption* [8] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages *nomencl* [9] and *glossaries* [10] can be used for the automatic creation of the lists of symbols and concepts used.

By default `acmart` prevents all widows and orphans (i.e. lonely lines at the beginning and the end of the page) and hyphenation at the end of the page. This is done by rather strict settings

```
\widowpenalty=10000
\clubpenalty=10000
\brokenpenalty=10000
```

However, this may lead to frustrating results when the authors must obey a page limit. Setting these penalties to smaller values may help if you absolutely need to.

Another problem might be the too strict line breaking rules. Again, a strategically placed `\sloppy` command or putting the problematic paragraph inside `sloppypar` environment might help—but beware the results might be, well, sloppy.

3 Implementation

3.1 Identification

We start with the declaration who we are. Most .dtx files put driver code in a separate driver file .drv. We roll this code into the main file, and use the pseudo-guard <gobble> for it.

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2016/08/06 v1.20 Typesetting articles for Association of
7 Computing Machinery]
```

And the driver code:

```
8 <*gobble>
9 \documentclass{ltxdoc}
10 \usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx}
11 \usepackage[tt=false]{libertine}
12 \usepackage[varqu]{zi4}
13 \usepackage[libertine]{newtxmath}
14 \usepackage[tableposition=top]{caption}
15 \usepackage{hypdoc}
16 \PageIndex
17 \CodelineIndex
18 \RecordChanges
19 \EnableCrossrefs
20 \begin{document}
21   \DocInput{acmart.dtx}
22 \end{document}
23 </gobble>
24 <*class>
25 \def\@classname{acmart}
```

3.2 Options

We need xkeyval since some of our options may have values:

```
26 \RequirePackage{xkeyval}
```

format The possible formats

```
27 \define@choicekey*+{acmart.cls}{format}[\ACM@format\ACM@format@nr]{%
28   manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
29   sigplan, sigchi, sigchi-a}[manuscript]{}{%
30   \ClassError{\@classname}{The option format must be manuscript,
31     acmsmall, acmlarge, acmtog, sigconf, siggraph,
32     sigplan, sigchi or sigchi-a}}
33 \def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{acmart.cls}{format=#1}}}
34 \@DeclareACMFormat{manuscript}
```

```

35 \DeclareACMFormat{acmsmall}
36 \DeclareACMFormat{acmlarge}
37 \DeclareACMFormat{acmtog}
38 \DeclareACMFormat{sigconf}
39 \DeclareACMFormat{siggraph}
40 \DeclareACMFormat{sigplan}
41 \DeclareACMFormat{sigchi}
42 \DeclareACMFormat{sigchi-a}
43 \ExecuteOptionsX{format}

\if@ACM@screen Whether we use screen mode
44 \define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
45   \if@ACM@screen
46     \PackageInfo{\@classname}{Using screen mode}%
47   \else
48     \PackageInfo{\@classname}{Not using screen mode}%
49   \fi}{\PackageError{\@classname}{Option screen can be either true or
50     false}}
51 \ExecuteOptionsX{screen=false}

\if@ACM@review Whether we use review mode
52 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
53   \if@ACM@review
54     \PackageInfo{\@classname}{Using review mode}%
55   \else
56     \PackageInfo{\@classname}{Not using review mode}%
57   \fi}{\PackageError{\@classname}{Option review can be either true or
58     false}}
59 \ExecuteOptionsX{review=false}

\if@ACM@authorversion Whether we use author's version
60 \define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
61   \if@ACM@authorversion
62     \PackageInfo{\@classname}{Using authorversion mode}%
63   \else
64     \PackageInfo{\@classname}{Not using authorversion mode}%
65   \fi}{\PackageError{\@classname}{Option authorversion can be either true or
66     false}}
67 \ExecuteOptionsX{authorversion=false}

\if@ACM@natbib@override Whether to override the format decision about natbib
68 \newif\if@ACM@natbib@override
69 \@ACM@natbib@overridefalse

\if@ACM@natbib Whether we use natbib mode
70 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
71   \@ACM@natbib@override=true
72   \if@ACM@natbib
73     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%

```

```

74 \else
75 \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
76 \fi}{\PackageError{\@classname}{Option natbib can be either true or
77 false}}

\if@ACM@anonymous Whether we use anonymous mode
78 \define@boolkey+{acmart.cls}{@ACM@}{anonymous}[true]{%
79 \if@ACM@anonymous
80 \PackageInfo{\@classname}{Using anonymous mode}%
81 \else
82 \PackageInfo{\@classname}{Not using anonymous mode}%
83 \fi}{\PackageError{\@classname}{Option anonymous can be either true or
84 false}}
85 \ExecuteOptionsX{anonymous=false}

\ACM@fontsize The font size to pass to the base class
86 \def\ACM@fontsize{
87 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
88 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
89 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
90 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

91 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
92 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
93 \ProcessOptionsX
94 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.3 Setting switches

```

\if@ACM@manuscript Whether we use manuscript mode
95 \newif\if@ACM@manuscript

\if@ACM@journal There are two kinds of publications: journals and books
96 \newif\if@ACM@journal

\if@ACM@sigchiamode The formatting of SIGCHI abstracts is quite unusual. We have a special switch for them.
97 \newif\if@ACM@sigchiamode

Setting up switches
98 \ifnum\ACM@format@nr=0\relax
99 \@ACM@manuscripttrue
100 \else
101 \@ACM@manuscriptfalse
102 \fi
103 \@ACM@sigchiamodefalse
104 \ifcase\ACM@format@nr
105 \relax % manuscript
106 \@ACM@journaltrue

```

```

107 \or % acmsmall
108   \@ACM@journaltrue
109 \or % acmlarge
110   \@ACM@journaltrue
111 \or % acmtog
112   \@ACM@journaltrue
113 \or % sigconf
114   \@ACM@journalfalse
115 \or % siggraph
116   \@ACM@journalfalse
117 \or % sigplan
118   \@ACM@journalfalse
119 \or % sigchi
120   \@ACM@journalfalse
121 \or % sigchi-a
122   \@ACM@journalfalse
123   \@ACM@sigchiamodetrue
124 \fi

```

A format sets up `\if@ACM@natbib` only if `\@ACM@natbib@override` is false (i.e. user did *not* override format's selection):

```

125 \if@ACM@natbib@override\else
126   \@ACM@natbibtrue
127 \fi

```

3.4 Loading base class and package

At this point we either have `\ACM@fontsize`, or use defaults

```

128 \ifx\ACM@fontsize\@empty
129   \ifcase\ACM@format@nr
130     \relax % manuscript
131     \def\ACM@fontsize{9pt}%
132   \or % acmsmall
133     \def\ACM@fontsize{10pt}%
134   \or % acmlarge
135     \def\ACM@fontsize{10pt}%
136   \or % acmtog
137     \def\ACM@fontsize{9pt}%
138   \or % sigconf
139     \def\ACM@fontsize{9pt}%
140   \or % siggraph
141     \def\ACM@fontsize{9pt}%
142   \or % sigplan
143     \def\ACM@fontsize{9pt}%
144   \or % sigchi
145     \def\ACM@fontsize{10pt}%
146   \or % sigchi-a
147     \def\ACM@fontsize{10pt}%
148   \fi
149 \fi

```

```

150 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
151 \LoadClass[\ACM@fontsize, reqno]{amsart}
152 \RequirePackage{microtype}

```

We need totpages package to calculate the number of pages

```

153 \RequirePackage{totpages}

```

The amsmath \collect@body is defined using \def. We load environ to access the \long version of the command

```

154 \RequirePackage{environ}

```

We use setspace for doublespacing

```

155 \if@ACM@manuscript
156 \RequirePackage{setspace}
157 \onehalfspacing
158 \fi

```

Citations. We patch \setcitestyle to allow, e.g., \setcitestyle{sort} and \setcitestyle{nosort}. We patch \citestyle to warn about undefined citation styles.

```

159 \if@ACM@natbib
160 \RequirePackage{natbib}
161 \renewcommand{\bibsection}{%
162   \section*{\refname}%
163   \phantomsection\addcontentsline{toc}{section}{\refname}%
164 }
165 \renewcommand{\bibfont}{\bibliofont}
166 \renewcommand\setcitestyle[1]{
167   \@for\@tempa:=#1\do
168   {\def\@tempb{round}\ifx\@tempa\@tempb
169     \renewcommand\NAT@open{(\}\renewcommand\NAT@close{)}\fi
170     \def\@tempb{square}\ifx\@tempa\@tempb
171       \renewcommand\NAT@open{[\}\renewcommand\NAT@close{]}\fi
172     \def\@tempb{angle}\ifx\@tempa\@tempb
173       \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
174     \def\@tempb{curly}\ifx\@tempa\@tempb
175       \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
176     \def\@tempb{semicolon}\ifx\@tempa\@tempb
177       \renewcommand\NAT@sep{;}\fi
178     \def\@tempb{colon}\ifx\@tempa\@tempb
179       \renewcommand\NAT@sep{:}\fi
180     \def\@tempb{comma}\ifx\@tempa\@tempb
181       \renewcommand\NAT@sep{,}\fi
182     \def\@tempb{authoryear}\ifx\@tempa\@tempb
183       \NAT@numbersfalse\fi
184     \def\@tempb{numbers}\ifx\@tempa\@tempb
185       \NAT@numberstrue\NAT@superfalse\fi
186     \def\@tempb{super}\ifx\@tempa\@tempb
187       \NAT@numberstrue\NAT@supertrue\fi
188     \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
189       \let\bibstyle=\gobble\fi

```



```

190 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
191 \let\bibstyle=\@citestyle\fi
192 \def\@tempb{sort}\ifx\@tempa\@tempb
193 \def\NAT@sort{\@ne}\fi
194 \def\@tempb{nosort}\ifx\@tempa\@tempb
195 \def\NAT@sort{\@z}\fi
196 \def\@tempb{compress}\ifx\@tempa\@tempb
197 \def\NAT@cmprs{\@ne}\fi
198 \def\@tempb{nocompress}\ifx\@tempa\@tempb
199 \def\NAT@cmprs{\@z}\fi
200 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
201 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
202 \def\@tempb{mcite}\ifx\@tempa\@tempb
203 \let\NAT@merge\@ne\fi
204 \def\@tempb{merge}\ifx\@tempa\@tempb
205 \ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}\fi
206 \def\@tempb{elide}\ifx\@tempa\@tempb
207 \ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}\fi
208 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
209 \NAT@longnamestrue\fi
210 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
211 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
212 \expandafter\NAT@find@eq\@tempa=\relax\@nil
213 \if\@tempc\relax\else
214 \expandafter\NAT@rem@eq\@tempc
215 \def\@tempb{open}\ifx\@tempa\@tempb
216 \xdef\NAT@open{\@tempc}\fi
217 \def\@tempb{close}\ifx\@tempa\@tempb
218 \xdef\NAT@close{\@tempc}\fi
219 \def\@tempb{aysep}\ifx\@tempa\@tempb
220 \xdef\NAT@aysep{\@tempc}\fi
221 \def\@tempb{yysep}\ifx\@tempa\@tempb
222 \xdef\NAT@yrsep{\@tempc}\fi
223 \def\@tempb{notesep}\ifx\@tempa\@tempb
224 \xdef\NAT@cmt{\@tempc}\fi
225 \def\@tempb{citesep}\ifx\@tempa\@tempb
226 \xdef\NAT@sep{\@tempc}\fi
227 \fi
228 }%
229 \NAT@@setcites
230 }
231 \renewcommand\citestyle[1]{%
232 \ifcsname bibstyle@#1\endcsname%
233 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
234 \else%
235 \latexerror{Undefined ‘#1’ citestyle}%
236 \fi
237 }%
238 \fi

```

`\bibstyle@acmauthoryear` The default author-year format:

```
239 \newcommand{\bibstyle@acmauthoryear}{%
240   \setcitestyle{%
241     authoryear,%
242     open={()},close={}},citesep={;},%
243     aysep={},yysep={},,%
244     notesep={, }}}
```

`\bibstyle@acmnumeric` The default numeric format:

```
245 \newcommand{\bibstyle@acmnumeric}{%
246   \setcitestyle{%
247     numbers,sort&compress,%
248     open={[]},close={[]},citesep={,},%
249     notesep={, }}}
```

The default is numeric:

```
250 \citestyle{acmnumeric}
```

Before we call `hyperref`, we redefine `\startsection` commands to their \LaTeX defaults, since `amsart` ones are too AMS-specific. We need to do this early since we want `hyperref` to have a chance to redefine them again:

```
251 \def\@startsection#1#2#3#4#5#6{%
252   \ifnoskipsec \leavevmode \fi
253   \par
254   \@tempskipa #4\relax
255   \@afterindenttrue
256   \ifdim \@tempskipa <\z@
257     \@tempskipa -\@tempskipa \@afterindentfalse
258   \fi
259   \if@nobreak
260     \everypar{%
261       \else
262         \addpenalty\@secpenalty\addvspace\@tempskipa
263       \fi
264       \ifstar
265         {\@ssect{#3}{#4}{#5}{#6}}%
266         {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}
267 \def\@sect#1#2#3#4#5#6[#7]#8{%
268   \ifnum #2>\c@secnumdepth
269     \let\@svsec\@empty
270   \else
271     \refstepcounter{#1}%
272     \protected@edef\@svsec{\@secntformat{#1}\relax}%
273   \fi
274   \@tempskipa #5\relax
275   \ifdim \@tempskipa>\z@
276     \begingroup
277       #6{%
278         \@hangfrom{\hskip #3\relax\@svsec}%
279         \interlinepenalty \@M #8\@par}%
280   \endgroup
281 }
```

```

280 \endgroup
281 \csname #1mark\endcsname{#7}%
282 \addcontentsline{toc}{#1}{%
283   \ifnum #2>\c@secnumdepth \else
284     \protect\numberline{\csname the#1\endcsname}%
285   \fi
286   #7}%
287 \else
288   \def\@svsechd{%
289     #6{\hskip #3\relax
290       \@svsec #8}%
291     \csname #1mark\endcsname{#7}%
292     \addcontentsline{toc}{#1}{%
293       \ifnum #2>\c@secnumdepth \else
294         \protect\numberline{\csname the#1\endcsname}%
295       \fi
296       #7}}%
297 \fi
298 \@xsect{#5}}
299 \def\@xsect#1{%
300   \@tempskipa #1\relax
301   \ifdim \@tempskipa>\z@
302     \par \nobreak
303     \vskip \@tempskipa
304     \afterheading
305   \else
306     \nobreakfalse
307     \global\@noskipsectrue
308     \everypar{%
309       \if@noskipsec
310         \global\@noskipsecfalse
311         {\setbox\z@\lastbox}%
312         \clubpenalty\@M
313         \begingroup \@svsechd \endgroup
314         \unskip
315         \@tempskipa #1\relax
316         \hskip -\@tempskipa
317       \else
318         \clubpenalty \@clubpenalty
319         \everypar{}%
320       \fi}%
321 \fi
322 \ignorespaces}
323 \def\@seccntformat#1{\csname the#1\endcsname\quad}
324 \def\@essect#1#2#3#4#5{%
325   \@tempskipa #3\relax
326   \ifdim \@tempskipa>\z@
327     \begingroup
328       #4{%
329         \@hangfrom{\hskip #1}%

```

```

330         \interlinepenalty \@M #5\@par}%
331     \endgroup
332 \else
333     \def\@svsechd{#4{\hskip #1\relax #5}}%
334 \fi
335 \@xsect{#3}}

And hyperref
336 \let\@footnotemark@nolink\@footnotemark
337 \let\@footnotetext@nolink\@footnotetext
338 \RequirePackage[bookmarksnumbered]{hyperref}
339 \urlstyle{rm}
340 \ifcase\ACM@format@nr
341 \relax % manuscript
342 \or % acmsmall
343 \or % acmlarge
344 \or % acmtog
345 \or % sigconf
346 \or % siggraph
347 \or % sigplan
348 \urlstyle{sf}
349 \or % sigchi
350 \or % sigchi-a
351 \urlstyle{sf}
352 \fi
353 \if@ACM@screen
354     \hypersetup{colorlinks,
355         linkcolor=ACMRed,
356         citecolor=ACMPurple,
357         urlcolor=ACMDarkBlue,
358         filecolor=ACMDarkBlue}
359 \else
360     \hypersetup{hidelinks}
361 \fi

Bibliography mangling.
362 \if@ACM@natbib
363     \let\citeN\cite
364     \let\cite\citep
365     \let\citeANP\citeauthor
366     \let\citeNN\citeyearpar
367     \let\citeyearNP\citeyear
368     \let\citeyear\citeyearpar
369     \let\citeNP\citealt
370     \def\shortcite#1{\citeyear{#1}}
371     \DeclareRobustCommand\citeA
372     {\begingroup\NAT@swafalse
373         \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
374     \providecommand\newblock{}%
375 \else
376     \providecommand\citename[1]{#1}

```

```
377 \fi
```

`\bibliographystyle` Amsart redefines `\bibliographystyle` since it prefers AMS bibliography. We turn it back to \LaTeX definition:

```
378 \def\bibliographystyle#1{%
379   \ifx\@begindocumenthook\@undefined\else
380     \expandafter\AtBeginDocument
381     \fi
382     {\if@filesw
383       \immediate\write\@auxout{\string\bibstyle{#1}}%
384       \fi}}
```

Graphics and color

```
385 \RequirePackage{graphicx, xcolor}
```

We define ACM colors according to [7]:

```
386 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
387 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
388 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
389 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
390 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
391 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
392 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
393 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}
```

3.5 Paper size and paragraphing

We use geometry for dimensions

```
394 \RequirePackage{geometry}
395 \ifcase\ACM@format@nr
396 \relax % manuscript
397   \geometry{letterpaper,head=1pc}%
398 \or % acmsmall
399   \geometry{twoside=true,
400     includeheadfoot, head=1pc, foot=2pc,
401     paperwidth=6.75in, paperheight=10in,
402     top=58pt, bottom=44pt, inner=46pt, outer=46pt
403   }%
404 \or % acmlarge
405   \geometry{twoside=true, head=1pc, foot=2pc,
406     paperwidth=8.5in, paperheight=11in,
407     includeheadfoot,
408     top=78pt, bottom=114pt, inner=81pt, outer=81pt
409   }%
410 \or % acmtog
411   \geometry{twoside=true, head=1pc, foot=2pc,
412     paperwidth=8.5in, paperheight=11in,
413     includeheadfoot, columnsep=24pt,
414     top=52pt, bottom=75pt, inner=52pt, outer=52pt
```

```

415     }%
416 \or % sigconf
417   \geometry{twoside=true, head=1pc,
418     paperwidth=8.5in, paperheight=11in,
419     includeheadfoot, columnsep=2pc,
420     top=57pt, bottom=73pt, inner=54pt, outer=54pt
421   }%
422 \or % siggraph
423   \geometry{twoside=true, head=1pc,
424     paperwidth=8.5in, paperheight=11in,
425     includeheadfoot, columnsep=2pc,
426     top=57pt, bottom=73pt, inner=54pt, outer=54pt
427   }%
428 \or % sigplan
429   \geometry{twoside=true, head=1pc,
430     paperwidth=8.5in, paperheight=11in,
431     includeheadfoot=false, columnsep=2pc,
432     top=1in, bottom=1in, inner=0.75in, outer=0.75in
433   }%
434 \or % sigchi
435   \geometry{twoside=true, head=1pc,
436     paperwidth=8.5in, paperheight=11in,
437     includeheadfoot, columnsep=2pc,
438     top=66pt, bottom=73pt, inner=54pt, outer=54pt
439   }%
440 \or % sigchi-a
441   \geometry{twoside=false, head=1pc,
442     paperwidth=11in, paperheight=8.5in,
443     includeheadfoot, marginparsep=72pt,
444     marginparwidth=170pt, columnsep=20pt,
445     top=72pt, bottom=72pt, left=314pt, right=72pt
446   }%
447   \@parswitchfalse
448   \reversemarginpar
449 \fi

\parindent Paragraphing
\parskip
450 \setlength\parindent{10\p@}
451 \setlength\parskip{\z@}
452 \ifcase\ACM@format@nr
453 \relax % manuscript
454 \or % acmsmall
455 \or % acmlarge
456 \or % acmtog
457   \setlength\parindent{9\p@}%
458 \or % sigconf
459 \or % siggraph
460 \or % sigplan
461 \or % sigchi
462 \or % sigchi-a

```

463 \fi

Footnotes require some consideration. We have several layers of footnotes: front-matter footnotes, “regular” footnotes and the special insert for bibstrip. In the old ACM classes bibstrip was a \@float. The problem with floats is that they tend to, well, float—and we want the guarantee they stay.

We use *manyfoot* for layered footnotes instead.

\copyrightpermissionfootnoterule This is the footnote rule that separates bibstrip from the rest of the paper. It is a full width rule.

```
464 \def\copyrightpermissionfootnoterule{\kern-3\p@
465   \hrule \@width \columnwidth \kern 2.6\p@}
```

```
466 \RequirePackage{manyfoot}
467 \SelectFootnoteRule[2]{copyrightpermission}
468 \DeclareNewFootnote{copyrightpermission}
```

\footnoterule Tschichold’s rules:

```
469 \def\footnoterule{\kern-3\p@
470   \hrule \@width 4pc \kern 2.6\p@}
```

\endminipage We do not use footnote rules in minipages

```
471 \def\endminipage{%
472   \par
473   \unskip
474   \ifvoid\@mpfootins\else
475     \vskip\skip\@mpfootins
476     \normalcolor
477     \unvbox\@mpfootins
478   \fi
479   \@minipagefalse %% added 24 May 89
480   \color@endgroup
481   \egroup
482   \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

\@makefnmark We do note use indentation for footnotes

```
483 \def\@makefnmark{\noindent\@makefnmark}
```

\@footnotetext In sigchi-a mode our footnotes are on the margins!

```
484 \if@ACM@sigchiamode
485 \long\def\@footnotetext#1{\marginpar{%
486   \reset@font\small
487   \interlinepenalty\interfootnotelinepenalty
488   \protected@edef\@currentlabel{%
489     \csname p@footnote\endcsname\@thefnmark
490   }%
491   \color@begingroup
492     \@makefnmark#1
493     \rule{z@footnotesep}{\ignorespaces#1}\@finalstrut\strutbox}%
}
```

```

494 \color@endgroup}}%
495 \fi

```

`\empfootnotetext` We want the footnotes in minipages centered:

```

496 \long\def\empfootnotetext#1{%
497   \global\setbox\empfootins\vbox{%
498     \unvbox\empfootins
499     \reset@font\footnotesize
500     \hsize\columnwidth
501     \@parboxrestore
502     \protected@edef\currentlabel
503       {\csname p\empfootnote\endcsname\@thefnmark}%
504     \color@begingroup\centering
505       \makefnmark{%
506         \rule\z@{\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
507         \color@endgroup}}

```

`\makefnmark` AMS classes use a buggy definition of `\makefnmark`. We revert to the standard one.

```

508 \def\makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}

```

3.6 Fonts

`\if@ACM@newfonts` Whether we load the new fonts

```

509 \newif\if@ACM@newfonts
510 \@ACM@newfontstrue
511 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
512   have libertine package installed. Please upgrade your
513   TeX}\@ACM@newfontsfalse}
514 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
515   have zi4 package installed. Please upgrade your TeX}\@ACM@newfontsfalse}
516 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
517   have newtxmath package installed. Please upgrade your
518   TeX}\@ACM@newfontsfalse}

```

We use Times throughout.

```

519 \if@ACM@newfonts
520 \RequirePackage[tt=false]{libertine}
521 \RequirePackage[varqu]{zi4}
522 \RequirePackage[libertine]{newtxmath}
523 \else
524 \RequirePackage{textcomp}
525 \fi

```

The SIGCHI extended abstracts are sans serif:

```

526 \if@ACM@sigchiamode
527   \renewcommand{\familydefault}{\sfdefault}
528 \fi

```


3.7 Floats

We use caption package

```

529 \RequirePackage{caption, float}
530 \captionsetup[table]{position=top}
531 \if@ACM@journal
532   \captionsetup{labelfont={sf, small},
533     textfont={sf, small}, margin=\z@}
534   \captionsetup[figure]{name={Fig.}}
535 \else
536   \captionsetup{labelfont={bf},
537     textfont={bf}, labelsep=colon, margin=\z@}
538   \ifcase\ACM@format@nr
539     \relax % manuscript
540     \or % acmsmall
541     \or % acmlarge
542     \or % acmtog
543     \or % sigconf
544     \or % siggraph
545     \captionsetup{textfont={it}}
546     \or % sigplan
547     \captionsetup{labelfont={bf},
548       textfont={normalfont}, labelsep=period, margin=\z@}
549     \or % sigchi
550     \captionsetup[figure]{labelfont={bf, small},
551       textfont={bf, small}}
552     \or % sigchi-a
553     \captionsetup[figure]{labelfont={bf, small},
554       textfont={bf, small}}
555   \fi
556 \fi

```

sidebar The sidebar environment:

```

557 \newfloat{sidebar}{}{sbar}
558 \floatname{sidebar}{Sidebar}
559 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

```

\@sidebar The processing of the saved text

```

560 \long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
561   \marginpar{\small#1}\egroup}

```

marginfigure The marginfigure environment:

```

562 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}

```

\@marginfigure The processing of the saved text

```

563 \long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
564   \marginpar{\centering\small#1}\egroup}

```

margintable The margintable environment:

```

565 \newenvironment{margintable}{\Collect@Body\@margintable}{}

```

`\@margintable` The processing of the saved text

```
566 \long\def\@margintable#1{\bgroup\captionsetup{type=table}%  
567 \marginpar{\centering\small#1}\egroup}
```

SIGCHI extended abstract provides an interesting possibility to push into the margin. Here we use `figure*` and `table*` for this.

`\fulltextwidth` We define the width of the boxes as

```
568 \newdimen\fulltextwidth  
569 \fulltextwidth=\dimexpr(\textwidth+\marginparwidth+\marginparsep)
```

`\@dblfloat` We redefine the double float command. First, we make the size bigger. Second, our default position is going to be `tp` (to give marginalia a chance)

```
570 \if@ACM@sigchiamode  
571 \def\@dblfloat{\bgroup\columnwidth=\fulltextwidth  
572 \let\endfloatbox\endwidefloatbox  
573 \def\@fpsaddddefault{\def\@fps{tp}}%  
574 \@float}  
575 \fi
```

`\enddblfloat` And the end. Just adding a `\bgroup`.

```
576 \if@ACM@sigchiamode  
577 \def\enddblfloat{%  
578 \endfloat\egroup}  
579 \fi
```

`\@endwidefloatbox` This is the end of a wide box - we basically move everything to the left

```
580 \def\@endwidefloatbox{%  
581 \par\vskip\z@skip  
582 \@minipagefalse  
583 \outer@nobreak  
584 \egroup  
585 \color@endbox  
586 \global\setbox\@currbox=\vbox{\moveleft  
587 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%  
588 \wd\@currbox=\textwidth  
589 }
```

3.8 Lists

```
590 \ifcase\ACM@format@nr  
591 \relax % manuscript  
592 \or % acmsmall  
593 \or % acmlarge  
594 \or % acmtog  
595 \or % sigconf  
596 \or % siggraph  
597 \or % sigplan  
598 \def\labelenumi{\theenumi.}
```

```

599 \def\labelenumii{\theenumii.}
600 \def\labelenumiii{\theenumiii.}
601 \def\labelenumiv{\theenumiv.}
602 \or % sigchi
603 \or % sigchi-a
604 \fi

\descriptionlabel We do not use default colon as \amsart does:
605 \renewcommand{\descriptionlabel}[1]{\hspace\labelsep \upshape\bfseries #1}

\description AMS uses additional indent of 6pt. Frank recommends dropping it.
606 \renewenvironment{description}{\list{}{%
607   \itemindent-12\p@
608   \labelwidth\z@ \let\makelabel\descriptionlabel}%
609 }{
610   \endlist
611 }
612 \let\enddescription=\endlist % for efficiency

```

3.9 Top matter data

We use keyval interface to define journal title and relevant information

```

613 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
614   CIE,%
615   CSUR,%
616   JACM,%
617   JDIQ,%
618   JEA,%
619   JERIC,%
620   JETC,%
621   JOCCH,%
622   TAAS,%
623   TACCESS,%
624   TACO,%
625   TALG,%
626   TALLIP,%
627   TAP,%
628   TCPS,%
629   TEAC,%
630   TECS,%
631   TIIS,%
632   TISSEC,%
633   TIST,%
634   TKDD,%
635   TMIS,%
636   TOCE,%
637   TOCHI,%
638   TOCL,%
639   TOCS,%

```

```

640 TOCT,%
641 TODAES,%
642 TODS,%
643 TOG,%
644 TOIS,%
645 TOIT,%
646 TOMACS,%
647 TOMM,%
648 TOMPECS,%
649 TOMS,%
650 TOPC,%
651 TOPS,%
652 TOPLAS,%
653 TOS,%
654 TOSEM,%
655 TOSN,%
656 TRETs,%
657 TSAS,%
658 TSC,%
659 TSLP,%
660 TWEB%
661 }{%
662 \ifcase\@journalCode@nr
663 \relax % CIE
664 \def\@journalName{ACM Computers in Entertainment}%
665 \def\@journalNameShort{ACM Comput. Entertain.}%
666 \def\@permissionCodeOne{1544-3574}%
667 \or % CSUR
668 \def\@journalName{ACM Computing Surveys}%
669 \def\@journalNameShort{ACM Comput. Surv.}%
670 \def\@permissionCodeOne{0360-0300}%
671 \or % JACM
672 \def\@journalName{Journal of the ACM}%
673 \def\@journalNameShort{J. ACM}%
674 \def\@permissionCodeOne{0004-5411}%
675 \or % JDIQ
676 \def\@journalName{ACM Journal of Data and Information Quality}%
677 \def\@journalNameShort{ACM J. Data Inform. Quality}%
678 \def\@permissionCodeOne{1936-1955}%
679 \or % JEA
680 \def\@journalName{ACM Journal of Experimental Algorithmics}%
681 \def\@journalNameShort{ACM J. Exp. Algor.}%
682 \def\@permissionCodeOne{1084-6654}%
683 \or % JERIC
684 \def\@journalName{ACM Journal of Educational Resources in Computing}%
685 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
686 \def\@permissionCodeOne{1073-0516}%
687 \or % JETC
688 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
689 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%

```

```

690 \def\@permissionCodeOne{1550-4832}%
691 \or % JOCH
692 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
693 \def\@journalName{ACM J. Comput. Cult. Herit.}%
694 \or % TAAS
695 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
696 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
697 \def\@permissionCodeOne{1556-4665}%
698 \or % TACCESS
699 \def\@journalName{ACM Transactions on Accessible Computing}%
700 \def\@journalNameShort{ACM Trans. Access. Comput.}%
701 \def\@permissionCodeOne{1936-7228}%
702 \or % TACO
703 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
704 \or % TALG
705 \def\@journalName{ACM Transactions on Algorithms}%
706 \def\@journalNameShort{ACM Trans. Algor.}%
707 \def\@permissionCodeOne{1549-6325}%
708 \or % TALLIP
709 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
710 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
711 \def\@permissionCodeOne{2375-4699}%
712 \or % TAP
713 \def\@journalName{ACM Transactions on Applied Perception}%
714 \or % TCPS
715 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
716 \or % TEAC
717 \def\@journalName{ACM Transactions on Economics and Computation}%
718 \or % TECS
719 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
720 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
721 \def\@permissionCodeOne{1539-9087}%
722 \or % TIIS
723 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
724 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
725 \def\@permissionCodeOne{2160-6455}%
726 \or % TISSEC
727 \def\@journalName{ACM Transactions on Information and System Security}%
728 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
729 \def\@permissionCodeOne{1094-9224}%
730 \or % TIST
731 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
732 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
733 \def\@permissionCodeOne{2157-6904}%
734 \or % TKDD
735 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
736 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
737 \def\@permissionCodeOne{1556-4681}%
738 \or % TMIS
739 \def\@journalName{ACM Transactions on Management Information Systems}%

```

```

740 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
741 \def\@permissionCodeOne{2158-656X}%
742 \or % TOCE
743 \def\@journalName{ACM Transactions on Computing Education}%
744 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
745 \def\@permissionCodeOne{1946-6226}%
746 \or % TOCHI
747 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
748 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
749 \def\@permissionCodeOne{1073-0516}%
750 \or % TOCL
751 \def\@journalName{ACM Transactions on Computational Logic}%
752 \def\@journalNameShort{ACM Trans. Comput. Logic}%
753 \def\@permissionCodeOne{1529-3785}%
754 \or % TOCS
755 \def\@journalName{ACM Transactions on Computer Systems}%
756 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
757 \def\@permissionCodeOne{0734-2071}%
758 \or % TOCT
759 \def\@journalName{ACM Transactions on Computation Theory}%
760 \def\@journalNameShort{ACM Trans. Comput. Theory}%
761 \def\@permissionCodeOne{1942-3454}%
762 \or % TODAES
763 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
764 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
765 \def\@permissionCodeOne{1084-4309}%
766 \or % TODS
767 \def\@journalName{ACM Transactions on Database Systems}%
768 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
769 \def\@permissionCodeOne{0362-5915}%
770 \or % TOG
771 \def\@journalName{ACM Transactions on Graphics}%
772 \def\@journalNameShort{ACM Trans. Graph.}%
773 \def\@permissionCodeOne{0730-0301}%
774 \or % TOIS
775 \def\@journalName{ACM Transactions on Information Systems}%
776 \def\@journalName{ACM Transactions on Information Systems}%
777 \def\@permissionCodeOne{1046-8188}%
778 \or % TOIT
779 \def\@journalName{ACM Transactions on Internet Technology}%
780 \def\@journalNameShort{ACM Trans. Internet Technol.}%
781 \def\@permissionCodeOne{1533-5399}%
782 \or % TOMACS
783 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
784 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
785 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
786 \or % TOMM
787 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
788 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
789 \def\@permissionCodeOne{1551-6857}%

```

```

790 \def\@permissionCodeTwo{0100}%
791 \or % TOMPECS
792 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
793 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
794 \def\@permissionCodeOne{2376-3639}%
795 \or % TOMS
796 \def\@journalName{ACM Transactions on Mathematical Software}%
797 \def\@journalNameShort{ACM Trans. Math. Softw.}%
798 \def\@permissionCodeOne{0098-3500}%
799 \or % TOPC
800 \def\@journalName{ACM Transactions on Parallel Computing}%
801 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
802 \def\@permissionCodeOne{1539-9087}%
803 \or % TOPS
804 \def\@journalName{ACM Transactions on Privacy and Security}%
805 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
806 \def\@permissionCodeOne{2471-2566}%
807 \or % TOPLAS
808 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
809 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
810 \def\@permissionCodeOne{0164-0925}%
811 \or % TOS
812 \def\@journalName{ACM Transactions on Storage}%
813 \def\@journalNameShort{ACM Trans. Storage}%
814 \def\@permissionCodeOne{1553-3077}%
815 \or % TOSEM
816 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
817 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
818 \def\@permissionCodeOne{1049-331X}%
819 \or % TOSN
820 \def\@journalName{ACM Transactions on Sensor Networks}%
821 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
822 \def\@permissionCodeOne{1550-4859}%
823 \or % TRET
824 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
825 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
826 \def\@permissionCodeOne{1936-7406}%
827 \or % TSAS
828 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
829 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
830 \def\@permissionCodeOne{2374-0353}%
831 \or % TSC
832 \def\@journalName{ACM Transactions on Social Computing}%
833 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
834 \def\@permissionCodeOne{2469-7818}%
835 \or % TSLP
836 \def\@journalName{ACM Transactions on Speech and Language Processing}%
837 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
838 \def\@permissionCodeOne{1550-4875}%
839 \or % TWEB

```

```

840 \def\@journalName{ACM Transactions on the Web}%
841 \def\@journalNameShort{ACM Trans. Web}%
842 \def\@permissionCodeOne{1559-1131}%
843 \fi
844 \ClassInfo{\@classname}{Using journal code \@journalCode}%
845 }{%
846 \ClassError{\@classname}{Incorrect journal #1}%
847 }%

\acmJournal And the syntactic sugar around it
848 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}

The defaults:
849 \def\@journalCode@nr{0}
850 \def\@journalName{}%
851 \def\@journalNameShort{\@journalName}%
852 \def\@permissionCodeOne{XXXX-XX}%
853 \def\@permissionCodeTwo{}%

\acmConference This is the conference command
854 \newcommand\acmConference[4][{}%
855 \gdef\acmConference@shortname{#1}%
856 \gdef\acmConference@name{#2}%
857 \gdef\acmConference@date{#3}%
858 \gdef\acmConference@venue{#4}%
859 \ifx\acmConference@shortname\@empty
860 \gdef\acmConference@shortname{#2}%
861 \fi}
862 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
863 DC, USA}

\subtitle The subtitle macro
864 \def\subtitle#1{\def\@subtitle{#1}}
865 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
866 \newcount\num@authorgroups
867 \num@authorgroups=0\relax

\if@insideauthorgroup Whether we are continuing an author group @insideauthorgroup insideauthorgroup-
false

\author Adding an author to the list of authors and addresses
868 \renewcommand\author[2][{}%
869 \if@insideauthorgroup\else
870 \global\advance\num@authorgroups by 1\relax
871 \global\@insideauthorgrouptrue
872 \fi
873 \ifx\addresses\@empty

```



```

874 \if@ACM@anonymous
875 \gdef\addresses{\@author{Anonymous Author(s)}}%
876 \gdef\authors{Anonymous Author(s)}%
877 \else
878 \gdef\addresses{\@author{#2}}%
879 \gdef\authors{#2}%
880 \fi
881 \else
882 \if@ACM@anonymous\else
883 \g@addto@macro\addresses{\and\@author{#2}}%
884 \g@addto@macro\authors{\and#2}%
885 \fi
886 \fi
887 \if@ACM@anonymous
888 \ifx\shortauthors\@empty
889 \gdef\shortauthors{Anon.}%
890 \fi
891 \else
892 \def\@tempa{#1}%
893 \ifx\@tempa\@empty
894 \ifx\shortauthors\@empty
895 \gdef\shortauthors{#2}%
896 \else
897 \g@addto@macro\shortauthors{\and#2}%
898 \fi
899 \else
900 \ifx\shortauthors\@empty
901 \gdef\shortauthors{#1}%
902 \else
903 \g@addto@macro\shortauthors{\and#1}%
904 \fi
905 \fi
906 \fi}

```

`\affiliation` The macro `\affiliation` mimics `\address` from `amsart`. Note that it has an optional argument we do not currently need, but keep for the possible future use.

```

907 \newcommand{\affiliation}[2][{}]{%
908 \global\@insideauthorgroupfalse
909 \if@ACM@anonymous\else
910 \g@addto@macro\addresses{\affiliation{#1}{#2}}%
911 \fi}

```

`\email` The macro `\email` mimics `\email` from `amsart`. Again it has an optional argument we do not currently need, but keep for the possible future use.

```

912 \renewcommand{\email}[2][{}]{%
913 \if@ACM@anonymous\else
914 \g@addto@macro\addresses{\email{#1}{#2}}%
915 \fi}

```

`\orcid` Right now we do not typeset orcid's gobble

```

\@titlenotes The titlenotes
916 \def\@titlenotes{}

\@titlenote Adding note to the title
917 \def\@titlenote#1{%
918   \g@addto@macro\@title{\footnotemark}%
919   \if@ACM@anonymous
920     \g@addto@macro\@titlenotes{%
921       \stepcounter{footnote}\footnotetext{Title note}}%
922   \else
923     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
924   \fi}

\@subtitlenotes The subtitlenotes
925 \def\@subtitlenotes{}

\@subtitlenote Adding note to the subtitle
926 \def\@subtitlenote#1{%
927   \g@addto@macro\@subtitle{\footnotemark}%
928   \if@ACM@anonymous
929     \g@addto@macro\@subtitlenotes{%
930       \stepcounter{footnote}\footnotetext{Subtitle note}}%
931   \else
932     \g@addto@macro\@subtitlenotes{%
933       \stepcounter{footnote}\footnotetext{#1}}%
934   \fi}

\@authornotes The authornotes
935 \def\@authornotes{}

\@authornote Adding note to the author
936 \def\@authornote#1{%
937   \if@ACM@anonymous\else
938     \g@addto@macro\addresses{\@authornotemark}
939     \g@addto@macro\@authornotes{%
940       \stepcounter{footnote}\footnotetext{#1}}%
941   \fi}

\acmVolume The current volume
942 \def\acmVolume#1{\def\@acmVolume{#1}}
943 \acmVolume{1}

\acmNumber The current number
944 \def\acmNumber#1{\def\@acmNumber{#1}}
945 \acmNumber{1}

\acmArticle The current article
946 \def\acmArticle#1{\def\@acmArticle{#1}}
947 \acmArticle{1}

```

<code>\acmArticleSeq</code>	The sequence number 948 <code>\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}</code> 949 <code>\acmArticleSeq{\@acmArticle}</code>
<code>\acmYear</code>	The current year 950 <code>\def\acmYear#1{\def\@acmYear{#1}}</code> 951 <code>\acmYear{2016}</code>
<code>\acmMonth</code>	The current month 952 <code>\def\acmMonth#1{\def\@acmMonth{#1}}</code> 953 <code>\acmMonth{1}</code>
<code>\@acmPubDate</code>	The publication date 954 <code>\def\@acmPubDate{\ifcase\@acmMonth\or</code> 955 <code>January\or February\or March\or April\or May\or June\or</code> 956 <code>July\or August\or September\or October\or November\or</code> 957 <code>December\fi~\@acmYear}</code>
<code>\acmPrice</code>	The price 958 <code>\def\acmPrice#1{\def\@acmPrice{#1}}</code> 959 <code>\acmPrice{15.00}</code>
<code>\acmISBN</code>	The book isbn 960 <code>\def\acmISBN#1{\def\@acmISBN{#1}}</code> 961 <code>\acmISBN{978-x-xxxx-xxxx-x/YY/MM}</code>
<code>\acmDOI</code>	The paper doi 962 <code>\def\acmDOI#1{\def\@acmDOI{#1}}</code> 963 <code>\acmDOI{10.1145/nnnnnnn.nnnnnnn}</code>
<code>\if@ACM@badge</code>	Whether to print badge. Note that either left or right badge triggers it: 964 <code>\newif\if@ACM@badge</code> 965 <code>\@ACM@badgefalse</code>
<code>\@ACM@badge@width</code>	The width of the badge 966 <code>\newlength\@ACM@badge@width</code> 967 <code>\setlength\@ACM@badge@width{5pc}</code>
<code>\@ACM@title@width</code>	The width of the badge 968 <code>\newlength\@ACM@title@width</code>
<code>\@ACM@badge@skip</code>	The space between the badge and the title 969 <code>\newlength\@ACM@badge@skip</code> 970 <code>\setlength\@ACM@badge@skip{1pc}</code>

`\acmBadgeR` Setting the right badge

```

971 \newcommand\acmBadgeR[2][\@ACM@badgetrue
972   \def\@acmBadgeR@url{#1}%
973   \def\@acmBadgeR@image{#2}}
974 \def\@acmBadgeR@url{}
975 \def\@acmBadgeR@image{}

```

`\acmBadgeL` Setting the left badge

```

976 \newcommand\acmBadgeL[2][\@ACM@badgetrue
977   \def\@acmBadgeL@url{#1}%
978   \def\@acmBadgeL@image{#2}}
979 \def\@acmBadgeL@url{}
980 \def\@acmBadgeL@image{}

```

`\startPage` The start page of the paper

```

981 \def\startPage#1{\def\@startPage{#1}}
982 \startPage{}

```

`\terms` Terms are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.

```

983 \def\terms#1{\def\@terms{#1}}
984 \terms{}

```

`\keywords` Keywords are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.

```

985 \def\keywords#1{\def\@keywords{#1}}
986 \keywords{}

```

`abstract` Amsart puts abstract in the box. Since we do not know whether we will use two column mode, we prefer to save the text

```

987 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}

```

`\@saveabstract` And saving the abstract

```

988 \long\def\@saveabstract#1{\long\gdef\@abstract{#1}}
989 \@saveabstract{}

```

`\@empty` The long version of `\@empty` (to compare with `\@abstract`)

```

990 \long\def\@empty{}

```

`\if@ACM@printcss` Whether to print CCS

```

991 \define@boolkey+{@ACM@topmatter@}{@ACM@}{printcss}[true]{%
992   \if@ACM@printcss
993     \ClassInfo{\@classname}{Printing CSS}%
994   \else
995     \ClassInfo{\@classname}{Suppressing CSS}%
996   \fi}{\ClassError{\@classname}{printcss must be true or false}}

```

```

\if@ACM@printacmref Whether to print ACM bib
997 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
998   \if@ACM@printacmref
999     \ClassInfo{\@classname}{Printing bibformat}%
1000   \else
1001     \ClassInfo{\@classname}{Suppressing bibformat}%
1002   \fi}{\ClassError{\@classname}{printacmref must be true or false}}

\if@ACM@printfolios Whether to print folios
1003 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1004   \if@ACM@printfolios
1005     \ClassInfo{\@classname}{Printing folios}%
1006   \else
1007     \ClassInfo{\@classname}{Suppressing folios}%
1008   \fi}{\ClassError{\@classname}{printfolios must be true or false}}

\settopmatter The usual syntactic sugar
1009 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

Now the settings
1010 \settopmatter{printcss=true, printacmref=true}
1011 \if@ACM@manuscript
1012   \settopmatter{printfolios=true}
1013 \else
1014   \if@ACM@journal
1015     \settopmatter{printfolios=true}
1016   \else
1017     \settopmatter{printfolios=false}
1018   \fi
1019 \fi

\@received The container for the paper history
1020 \def\@received{}

\received The \received command
1021 \newcommand\received[2][\def\@tempa{#1}%
1022   \ifx\@tempa\@empty
1023     \ifx\@received\@empty
1024       \gdef\@received{Received #2}%
1025     \else
1026       \g@addto@macro{\@received}{; revised #2}%
1027     \fi
1028   \else
1029     \ifx\@received\@empty
1030       \gdef\@received{#1 #2}%
1031     \else
1032       \g@addto@macro{\@received}{; #1 #2}%
1033     \fi
1034   \fi}

```

```

1035 \AtEndDocument{%
1036   \ifx\@received\@empty\else
1037     \par\bigskip\noindent\small\normalfont\@received\par
1038   \fi}

```

3.10 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1039 \RequirePackage{comment}
1040 \excludecomment{CCSXML}

```

\@concepts This is the storage macro for concepts

```
1041 \let\@concepts\@empty
```

\ccsdesc The first argument is the significance, the second is the concept(s)

```

1042 \newcommand\ccsdesc[2][100]{%
1043   \ccsdesc@parse#1~#2~}

```

\ccsdesc@parse The parser of the expression Significance~General~Specific:

```

1044 \def\ccsdesc@parse#1~#2~#3~{%
1045   \expandafter\ifx\csname CCS@#2\endcsname\relax
1046     \expandafter\gdef\csname CCS@#2\endcsname{\textbullet\textbf{#2} $\to$ }%
1047     \g@addto@macro{\@concepts}{\csname CCS@#2\endcsname}\fi
1048     \expandafter\g@addto@macro\expandafter{\csname CCS@#2\endcsname}{%
1049       \ifnum#1>499\textbf{#3; } \else
1050       \ifnum#1>299\textit{#3; } \else
1051       #3; \fi\fi}}

```

3.11 Copyright system

This is from acmcopyright.sty

\if@printcopyright A flag whether to print copyright symbol

```

1052 \newif\if@printcopyright
1053 \@printcopyrighttrue

```

\if@printpermission Whether to print permission block

```

1054 \newif\if@printpermission
1055 \@printpermissiontrue

```

\if@acmowned Whether ACM owns the rights to the paper

```

1056 \newif\if@acmowned
1057 \@acmownedtrue

```

Keys:

```

1058 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1059   \acm@copyrightinput\acm@copyrightmode]{none,acmcopyright,acmlicensed,%
1060   rightsretained,usgov,usgovmixed,cagov,cagovmixed,%

```

```

1061 licensedusgovmixed,licensedcagovmixed,othergov,licensedothergov}{%
1062 \@printpermissiontrue
1063 \@printcopyrighttrue
1064 \@acmownedtrue
1065 \ifnum\acm@copyrightmode=0\relax % none
1066 \@printpermissionfalse
1067 \@printcopyrightfalse
1068 \@acmownedfalse
1069 \fi
1070 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1071 \@acmownedfalse
1072 \fi
1073 \ifnum\acm@copyrightmode=3\relax % rightsretained
1074 \@acmownedfalse
1075 \fi
1076 \ifnum\acm@copyrightmode=4\relax % usgov
1077 \@printpermissiontrue
1078 \@printcopyrightfalse
1079 \@acmownedfalse
1080 \fi
1081 \ifnum\acm@copyrightmode=6\relax % cagov
1082 \@acmownedfalse
1083 \fi
1084 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1085 \@acmownedfalse
1086 \fi
1087 \ifnum\acm@copyrightmode=9\relax % licensedcagovmixed
1088 \@acmownedfalse
1089 \fi
1090 \ifnum\acm@copyrightmode=10\relax % othergov
1091 \@acmownedtrue
1092 \fi
1093 \ifnum\acm@copyrightmode=11\relax % licensedothergov
1094 \@acmownedfalse
1095 \fi}

```

\setcopyright This is the syntactic sugar around setting keys.

```

1096 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1097 \setcopyright{acmcopyright}

```

\@copyrightowner Here is the owner of the copyright

```

1098 \def\@copyrightowner{%
1099 \ifcase\acm@copyrightmode\relax % none
1100 \or % acmcopyright
1101 ACM\@.
1102 \or % acmlicensed
1103 Copyright held by the owner/author(s). Publication rights licensed to
1104 ACM\@.
1105 \or % rightsretained
1106 Copyright held by the owner/author(s).

```

```

1107 \or % usgov
1108 \or % usgovmixed
1109 ACM\@.
1110 \or % cagov
1111 Crown in Right of Canada.
1112 \or %cagovmixed
1113 ACM\@.
1114 \or %licensedusgovmixed
1115 Copyright held by the owner/author(s). Publication rights licensed to
1116 ACM\@.
1117 \or %licensedcagovmixed
1118 Copyright held by the owner/author(s). Publication rights licensed to
1119 ACM\@.
1120 \or % othergov
1121 ACM\@.
1122 \or % licensedothergov
1123 Copyright held by the owner/author(s). Publication rights licensed to
1124 ACM\@.
1125 \fi}

```

\@formatdoi Print a clickable doi

```

1126 \def\@formatdoi#1{\url{http://dx.doi.org/#1}}

```

\@copyrightpermission The canned permission block.

```

1127 \def\@copyrightpermission{%
1128 \ifcase\acm@copyrightmode\relax % none
1129 \or % acmcopyright
1130 Permission to make digital or hard copies of all or part of this
1131 work for personal or classroom use is granted without fee provided
1132 that copies are not made or distributed for profit or commercial
1133 advantage and that copies bear this notice and the full citation on
1134 the first page. Copyrights for components of this work owned by
1135 others than ACM must be honored. Abstracting with credit is
1136 permitted. To copy otherwise, or republish, to post on servers or to
1137 redistribute to lists, requires prior specific permission
1138 and\hspace*{.5pt}/or a fee. Request permissions from
1139 permissions@acm.org.
1140 \or % acmlicensed
1141 Permission to make digital or hard copies of all or part of this
1142 work for personal or classroom use is granted without fee provided
1143 that copies are not made or distributed for profit or commercial
1144 advantage and that copies bear this notice and the full citation on
1145 the first page. Copyrights for components of this work owned by
1146 others than the author(s) must be honored. Abstracting with credit
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```


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 1162 redistribution is allowed, provided that the article citation is
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 1185 use is granted. Copies must bear this notice and the full citation
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```

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1226 or affiliate of a national government. As such, the Government
1227 retains a nonexclusive, royalty-free right to publish or reproduce
1228 this article, or to allow others to do so, for Government purposes
1229 only.
1230 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
1231 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1232 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
1233 \def\@teaserfigures{}

teaserfigure The teaser figure
1234 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
1235 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks, so the anonymous key works
1236 \renewcommand{\thanks}[1]{%
1237 \ifnotempty{#1}{%
1238 \ifACM@anonymous
1239 \g@addto@macro\thankses{\thanks{A note}}%
1240 \else
1241 \g@addto@macro\thankses{\thanks{#1}}%
1242 \fi}}

```

3.12 Typesetting top matter

`\mktitle@bx` Some of our formats use two column design, some use one column one. In all cases we use wide title. Thus we typeset the top matter in a special box to be use in the construction `\twocolumn[⟨box⟩]`.

1243 `\newbox\mktitle@bx`

`\maketitle` The (in)famous `\maketitle`. Note that in sigchi-a mode authors are *not* in the title box.

Another note: there is a subtle difference between author notes, title notes and thankses. The latter refer to the paper itself, and therefore belong to the copyright/permission block. By the way, this was the default behavior of the old ACM classes.

```

1244 \def\maketitle{%
1245   \if@ACM@anonymous
1246     % Anonymize omission of \author-s
1247     \ifnum\num@authorgroups=0\author{}\fi
1248   \fi
1249   \begingroup
1250   \let\@footnotemark\@footnotemark@nolink
1251   \let\@footnotetext\@footnotetext@nolink
1252   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1253   \@topnum\z@ % this prevents figures from falling at the top of page
1254               % 1
1255   \hsize=\textwidth
1256   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1257   \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
1258   \printtopmatter
1259   \if@ACM@sigchiamode\mkauthors\fi
1260   \setcounter{footnote}{0}%
1261   \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1262   \@titlenotes
1263   \@subtitlenotes
1264   \@authornotes
1265   \let\@makefnmark\relax \let\@thefnmark\relax
1266   \let\@makefntext\noindent
1267   \ifx\@empty\thankses\else
1268     \footnotetextcopyrightpermission{%
1269       \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1270   \fi
1271   \footnotetextcopyrightpermission{\parindent\z@\parskip0.1\baselineskip
1272   \if@ACM@authorversion\else
1273     \if@printpermission\@copyrightpermission\par\fi
1274   \fi
1275   \if@ACM@manuscript\else
1276     \if@ACM@journal\else % Print the conference short name
1277       {\itshape \acmConference@shortname, \acmConference@venue}\par
1278     \fi
1279   \fi
1280   \if@printcopyright
1281     \copyright\ @copyrightyear\ \@copyrightowner\

```

```

1282 \else
1283   \@copyrightyear.\
1284 \fi
1285 \if@ACM@manuscript
1286   Manuscript submitted to ACM\
1287 \else
1288   \if@ACM@authorversion
1289     This is the author's version of the work. It is posted here for
1290     your personal use. Not for redistribution. The definitive Version
1291     of Record was published in
1292     \if@ACM@journal
1293       \emph{\@journalName}%
1294     \else
1295       \emph{Proceedings of \acmConference@name, \acmConference@date}%
1296     \fi
1297     \ifx\@acmDOI\@empty
1298       .
1299     \else
1300       , \@formatdoi{\@acmDOI}.
1301     \fi\
1302   \else
1303     \if@ACM@journal
1304       \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle\
1305       \$\@acmPrice\
1306       DOI: \nolinkurl{\@acmDOI}%
1307     \else % Conference
1308       \@acmISBN
1309       \ifx\@acmPrice\@empty.\else\dots$\@acmPrice\fi\
1310       DOI: \nolinkurl{\@acmDOI}%
1311     \fi
1312   \fi
1313 \fi}%
1314 \endgroup
1315 \setcounter{footnote}{0}%
1316 \@mkabstract
1317 \if@ACM@printcss
1318   \ifx\@concepts\@empty\else\bgroup
1319     {\@specialsection{CCS Concepts}%
1320     \@concepts\par}\egroup
1321   \fi
1322 \fi
1323 \if\@terms\@empty\else\bgroup
1324   {\@specialsection{General Terms}%
1325   \@terms\par}\egroup
1326 \fi
1327 \ifx\@keywords\@empty\else\bgroup
1328   {\if@ACM@journal
1329     \@specialsection{Additional Key Words and Phrases}%
1330   \else
1331     \@specialsection{Keywords}%

```

```

1332     \fi
1333     \@keywords}\par\egroup
1334   \fi
1335   \andify\authors
1336   \andify\shortauthors
1337   \global\let\authors=\authors
1338   \global\let\shortauthors=\shortauthors
1339   \if@ACM@printacmref
1340     \mkbibcitation
1341   \fi
1342   \hypersetup{pdfauthor={\authors},
1343     pdftitle={\@title}, pdfkeywords={\@concepts}}%
1344   \@printendtopmatter
1345   \@afterindentfalse
1346   \@afterheading
1347 }

```

`\@specialsection` This macro starts section for proceedings and uses small for journals

```

1348 \def\@specialsection#1{%
1349   \ifcase\ACM@format@nr
1350     \relax % manuscript
1351     \par\medskip\small\noindent#1: %
1352   \or % acmsmall
1353     \par\medskip\small\noindent#1: %
1354   \or % acmlarge
1355     \par\medskip\small\noindent#1: %
1356   \or % acmtog
1357     \par\medskip\small\noindent#1: %
1358   \or % sigconf
1359     \section*{#1}%
1360   \or % siggraph
1361     \section*{#1}%
1362   \or % sigplan
1363     \paragraph*{#1}%
1364   \or % sigchi
1365     \section*{#1}%
1366   \or % sigchi-a
1367     \section*{#1}%
1368   \fi}

```

`\@printtopmatter` The printing of top matter starts the new page, and uses the given title box. Note that for sigchi-a we print badges here rather than in `\mktitle` since we want them on the margins.

```

1369 \def\@printtopmatter{%
1370   \ifx\@startPage\@empty
1371     \gdef\@startPage{1}%
1372   \else
1373     \setcounter{page}{\@startPage}%
1374   \fi

```

```

1375 \thispagestyle{firstpagestyle}%
1376 \noindent
1377 \ifcase\ACM@format@nr
1378 \relax % manuscript
1379 \box\mktitle@bx\par
1380 \noindent\hrulefill\par
1381 \or % acmsmall
1382 \box\mktitle@bx\par
1383 \noindent\hrulefill\par
1384 \or % acmlarge
1385 \box\mktitle@bx\par
1386 \noindent\hrulefill\par
1387 \or % acmtog
1388 \twocolumn[\box\mktitle@bx]%
1389 \or % sigconf
1390 \twocolumn[\box\mktitle@bx]%
1391 \or % siggraph
1392 \twocolumn[\box\mktitle@bx]%
1393 \or % sigplan
1394 \twocolumn[\box\mktitle@bx]%
1395 \or % sigchi
1396 \twocolumn[\box\mktitle@bx]%
1397 \or % sigchi-a
1398 \par\box\mktitle@bx\par\bigskip
1399 \if@ACM@badge
1400 \marginpar{\noindent
1401 \ifx\@acmBadgeL@image\@empty\else
1402 \href{\@acmBadgeL@url}{%
1403 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1404 \hskip\@ACM@badge@skip
1405 \fi
1406 \ifx\@acmBadgeR@image\@empty\else
1407 \href{\@acmBadgeR@url}{%
1408 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1409 \fi}%
1410 \fi
1411 \fi
1412 }

```

\@mktitle The title of the article

```

1413 \def\@mktitle{%
1414 \ifcase\ACM@format@nr
1415 \relax % manuscript
1416 \@mktitle@i
1417 \or % acmsmall
1418 \@mktitle@i
1419 \or % acmlarge
1420 \@mktitle@i
1421 \or % acmtog
1422 \@mktitle@i

```

```

1423 \or % sigconf
1424     \@mkttitle@iii
1425 \or % siggraph
1426     \@mkttitle@iii
1427 \or % sigplan
1428     \@mkttitle@iii
1429 \or % sigchi
1430     \@mkttitle@iii
1431 \or % sigchi-a
1432     \@mkttitle@iv
1433 \fi
1434 }

\@titlefont The font to typeset title
1435 \def\@titlefont{%
1436     \ifcase\ACM@format@nr
1437     \relax % manuscript
1438     \LARGE\bfseries\sffamily
1439 \or % acmsmall
1440     \LARGE\bfseries\sffamily
1441 \or % acmlarge
1442     \LARGE\bfseries\sffamily
1443 \or % acmtog
1444     \Huge\sffamily
1445 \or % sigconf
1446     \Huge\sffamily\bfseries
1447 \or % siggraph
1448     \Huge\sffamily\bfseries
1449 \or % sigplan
1450     \Huge\bfseries
1451 \or % sigchi
1452     \Huge\sffamily\bfseries
1453 \or % sigchi-a
1454     \Huge\bfseries
1455 \fi}

\@subtitlefont The font to typeset title
1456 \def\@subtitlefont{%
1457     \ifcase\ACM@format@nr
1458     \relax % manuscript
1459     \mdseries
1460 \or % acmsmall
1461     \mdseries
1462 \or % acmlarge
1463     \mdseries
1464 \or % acmtog
1465     \LARGE
1466 \or % sigconf
1467     \LARGE\mdseries
1468 \or % siggraph

```

```

1469 \LARGE\mdseries
1470 \or % sigplan
1471 \LARGE\mdseries
1472 \or % sigchi
1473 \LARGE\mdseries
1474 \or % sigchi-a
1475 \mdseries
1476 \fi}

```

`\mktitle@i` The version of `\mktitle` for most journals

```

1477 \def\mktitle@i{\hsize=\textwidth
1478 \ACM@title@width=\hsize
1479 \ifx\acmBadgeL@image\empty\else
1480 \advance\ACM@title@width by -\ACM@badge@width
1481 \advance\ACM@title@width by -\ACM@badge@skip
1482 \fi
1483 \ifx\acmBadgeR@image\empty\else
1484 \advance\ACM@title@width by -\ACM@badge@width
1485 \advance\ACM@title@width by -\ACM@badge@skip
1486 \fi
1487 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
1488 \ifx\acmBadgeL@image\empty\else
1489 \raisebox{-.5\baselineskip}{\z@\z@{\href{\acmBadgeL@url}{%
1490 \includegraphics[width=\ACM@badge@width]{\acmBadgeL@image}}}%
1491 \hskip\ACM@badge@skip
1492 \fi
1493 \parbox[t]{\ACM@title@width}{\raggedright
1494 \@titlefont\noindent
1495 \@title
1496 \ifx\@subtitle\empty\else
1497 \par\noindent{\@subtitlefont\@subtitle}
1498 \fi}%
1499 \ifx\acmBadgeR@image\empty\else
1500 \hskip\ACM@badge@skip
1501 \raisebox{-.5\baselineskip}{\z@\z@{\href{\acmBadgeR@url}{%
1502 \includegraphics[width=\ACM@badge@width]{\acmBadgeR@image}}}%
1503 \fi
1504 \par\bigskip}}%

```

`\mktitle@ii` The version of `\mktitle` for TOG. Since v1.06 is subsumed by the `\mktitle@i` macro

`\mktitle@iii` The version of `\mktitle` for sigproc. Note that since the title is centered, we leave the space for the left badge even if only the right badge is defined.

```

1505 \def\mktitle@iii{\hsize=\textwidth
1506 \setbox\mktitle@bx=\vbox{\@titlefont\centering
1507 \ACM@title@width=\hsize
1508 \if\ACM@badge
1509 \advance\ACM@title@width by -2\ACM@badge@width
1510 \advance\ACM@title@width by -2\ACM@badge@skip
1511 \parbox[b]{\ACM@badge@width}{\strut

```



```

1512         \ifx\@acmBadgeL@image\@empty\else
1513             \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
1514                 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1515             \fi}%
1516         \hskip\@ACM@badge@skip
1517     \fi
1518     \parbox[t]{\@ACM@title@width}{\centering\@titlefont
1519         \@title
1520         \ifx\@subtitle\@empty\else
1521             \par\noindent{\@subtitlefont\@subtitle}
1522         \fi
1523     }%
1524     \if@ACM@badge
1525         \hskip\@ACM@badge@skip
1526         \parbox[b]{\@ACM@badge@width}{\strut
1527             \ifx\@acmBadgeR@image\@empty\else
1528                 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
1529                     \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1530                 \fi}%
1531         \fi
1532     \par\bigskip}}%

```

`\@mktitle@iv` The version of `\@mktitle` for sigchi-a

```

1533 \def\@mktitle@iv{\hsize=\textwidth
1534     \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
1535         \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
1536         \noindent\@title
1537         \ifx\@subtitle\@empty\else
1538             \par\noindent\@subtitlefont\@subtitle
1539         \fi
1540     \par\bigskip}}%

```

`\@ACM@addtoaddress` The macro adds an item to address using the following rules:

1. If we start a paragraph, add the item
2. Otherwise, add a comma and the item
3. However, the comma is deleted, if it is on the end of the line. We use the magic cleaders trick for this.

```

1541 \newbox\@ACM@commabox
1542 \def\@ACM@addtoaddress#1{%
1543     \ifvmode\else
1544         \setbox\@ACM@commabox=\hbox{, }%
1545         \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
1546     \fi
1547     #1}

```

`\institution` Theoretically we can define the macros for `\affiliation` inside the `\@mkauthors`-style commands. However, this would lead to a strange error if an author uses them outside `\affiliation`. Of course we can make them produce an error message, but...

`\streetaddress`
`\city`
`\state`
`\postcode`
`\country`

We follow the strange American tradition of no comma before zip code.

```
1548 \if@ACM@journal
1549   \let\position\@gobble
1550   \def\institution#1{#1\ignorespaces}%
1551   \let\department\@gobble
1552   \let\streetaddress\@gobble
1553   \let\city\@gobble
1554   \let\state\@gobble
1555   \let\postcode\@gobble
1556   \let\country\@gobble
1557 \else
1558   \def\position#1{#1\par}%
1559   \def\institution#1{#1\par}%
1560   \def\department#1{#1\par}%
1561   \def\streetaddress#1{#1\par}%
1562   \let\city\@ACM@addtoaddress
1563   \let\state\@ACM@addtoaddress
1564   \def\postcode#1{\unskip\space#1}%
1565   \let\country\@ACM@addtoaddress
1566 \fi
```

\@mkauthors Typesetting authors

```
1567 \def\@mkauthors{\begingroup
1568   \hsize=\textwidth
1569   \ifcase\ACM@format@nr
1570     \relax % manuscript
1571     \@mkauthors@i
1572   \or % acmsmall
1573     \@mkauthors@i
1574   \or % acmlarge
1575     \@mkauthors@i
1576   \or % acmtog
1577     \@mkauthors@i
1578   \or % sigconf
1579     \@mkauthors@iii
1580   \or % siggraph
1581     \@mkauthors@iii
1582   \or % sigplan
1583     \@mkauthors@iii
1584   \or % sigchi
1585     \@mkauthors@iii
1586   \or % sigchi-a
1587     \@mkauthors@iv
1588   \fi
1589 \endgroup
1590 }
```

\@authorfont Somehow different conferences use different fonts for author names. Why?

```
1591 \def\@authorfont{\Large\sffamily}
```

`\@affiliationfont` Font for affiliations

```
1592 \def\@affiliationfont{\normalsize\normalfont}
```

Adjusting fonts for different formats

```
1593 \ifcase\ACM@format@nr
1594 \relax % manuscript
1595 \or % acmsmall
1596   \def\@authorfont{\large\sffamily}
1597   \def\@affiliationfont{\small\normalfont}
1598 \or % acmlarge
1599 \or % acmtog
1600   \def\@authorfont{\LARGE\sffamily}
1601   \def\@affiliationfont{\large}
1602 \or % sigconf
1603   \def\@authorfont{\LARGE}
1604   \def\@affiliationfont{\large}
1605 \or % siggraph
1606   \def\@authorfont{\normalsize\normalfont}
1607   \def\@affiliationfont{\normalsize\normalfont}
1608 \or % sigplan
1609   \def\@authorfont{\Large\normalfont}
1610   \def\@affiliationfont{\normalsize\normalfont}
1611 \or % sigchi
1612   \def\@authorfont{\bfseries}
1613   \def\@affiliationfont{\mdseries}
1614 \or % sigchi-a
1615   \def\@authorfont{\bfseries}
1616   \def\@affiliationfont{\mdseries}
1617 \fi
```

`\@typeset@author@line` At this point we have `\@currentauthors` and `\@currentaffiliations`. We typeset them in the journal style

```
1618 \def\@typeset@author@line{%
1619   \andify\@currentauthors\par\noindent
1620   \@currentauthors\def\@currentauthors{}%
1621   \ifx\@currentaffiliations\empty\else
1622     \andify\@currentaffiliations
1623     \unskip, {\@currentaffiliations}\par
1624   \fi
1625   \def\@currentaffiliations{}}
```

`\@mkauthors@i` This is version used in most formats. Note that `\and` between authors with the same affiliation becomes `_and_`:

```
1626 \def\@mkauthors@i{%
1627   \def\@currentauthors{}%
1628   \def\@currentaffiliations{}%
1629   \global\let\and\@typeset@author@line
1630   \def\@author##1{%
1631     \ifx\@currentauthors\empty
```

```

1632     \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
1633     \else
1634         \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
1635     \fi
1636     \gdef\and{}}%
1637 \def\email##1##2{%
1638 \def\affiliation##1##2{%
1639     \def\@tempa{##2}\ifx\@tempa\@empty\else
1640         \ifx\@currentaffiliations\@empty
1641             \gdef\@currentaffiliations{\@affiliationfont##2}%
1642         \else
1643             \g@addto@macro{\@currentaffiliations}{\and##2}%
1644         \fi
1645     \fi
1646     \global\let\and\@typeset@author@line}
1647 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
1648     \noindent\addresses\@typeset@author@line
1649     \par\medskip}%
1650 }

```

`\@mkauthors@ii` `\@mkauthors@ii` was version used in acmtog. No longer necessary

`\author@bx` The box to put individual author to

```
1651 \newbox\author@bx
```

`\author@bx@wd` The width of the author box

```
1652 \newdimen\author@bx@wd
```

`\author@bx@sep` The separation between the author boxes

```
1653 \newskip\author@bx@sep
```

```
1654 \author@bx@sep=1pc\relax
```

`\@typeset@author@bx` Typesetting the box with authors. Note that in SIGCHI-A the box is not centered.

```

1655 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
1656     \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
1657         \@authorfont\@currentauthors\par\@affiliationfont
1658         \@currentaffiliation}\egroup
1659     \box\author@bx\hspace{\author@bx@sep}%
1660     \gdef\@currentauthors{}}%
1661     \gdef\@currentaffiliation{}}

```

`\@mkauthors@iii` The sigconf version. Here we use centered design with each author in a separate box.

```
1662 \def\@mkauthors@iii{%
```

First, we need to determine the design of the author strip. The boxes are separated by `\author@bx@sep` plus two `\author@bx@sep` margins. This means that each box must be of width $(\text{\textwidth} - \text{\author@bx@sep})/N - \text{\author@bx@sep}$, where N is the number of boxes per row.

```
1663     \author@bx@wd=\textwidth\relax
```

```

1664 \advance\author@bx@wd by -\author@bx@sep\relax
1665 \ifcase\num@authorgroups
1666 \relax % 0?
1667 \or % 1=one author per row
1668 \or % 2=two authors per row
1669 \divide\author@bx@wd by \num@authorgroups\relax
1670 \or % 3=three authors per row
1671 \divide\author@bx@wd by \num@authorgroups\relax
1672 \or % 4=two authors per row (!)
1673 \divide\author@bx@wd by 2\relax
1674 \else % three authors per row
1675 \divide\author@bx@wd by 3\relax
1676 \fi
1677 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

1678 \gdef\@currentauthors{}%
1679 \gdef\@currentaffiliation{}%
1680 \def\author##1{\ifx\@currentauthors\empty
1681 \gdef\@currentauthors{\par##1}%
1682 \else
1683 \g@addto@macro\@currentauthors{\par##1}%
1684 \fi
1685 \gdef\and{}}%
1686 \def\email##1##2{\ifx\@currentaffiliation\empty
1687 \gdef\@currentaffiliation{\nolinkurl{##2}}%
1688 \else
1689 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
1690 \fi}%
1691 \def\affiliation##1##2{\ifx\@currentaffiliation\empty
1692 \gdef\@currentaffiliation{##2}%
1693 \else
1694 \g@addto@macro\@currentaffiliation{\par##2}%
1695 \fi
1696 \global\let\and\@typeset@author@bx
1697 }%

```

Actual typesetting is done by \and macro:

```

1698 \hsize=\textwidth
1699 \global\setbox\mktitle@bx=\vbox{\noindent
1700 \box\mktitle@bx\par\medskip\leavevmode
1701 \lineskip=1pc\relax\centering\hspace*{-1em}%
1702 \addresses\let\and\@typeset@author@bx\and\par\bigskip}}

```

\@mkauthors@iv The sigchia version. Now we put authors in the main text, and no more than 2 authors per line.

```

1703 \def\@mkauthors@iv{%

```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must

be of width $(\text{\textwidth} - \text{\author@bx@sep})/N - \text{\author@bx@sep}$, where N is the number of boxes per row.

```

1704 \author@bx@wd=\columnwidth\relax
1705 \advance\author@bx@wd by -\author@bx@sep\relax
1706 \ifcase\num@authorgroups
1707 \relax % 0?
1708 \or % 1=one author per row
1709 \else % 2=two authors per row
1710 \divide\author@bx@wd by 2\relax
1711 \fi
1712 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

1713 \gdef\@currentauthors{}%
1714 \gdef\@currentaffiliation{}%
1715 \def\@author##1{\ifx\@currentauthors\empty
1716 \gdef\@currentauthors{\par##1}%
1717 \else
1718 \g@addto@macro\@currentauthors{\par##1}%
1719 \fi
1720 \gdef\and{}}%
1721 \def\email##1##2{\ifx\@currentaffiliation\empty
1722 \gdef\@currentaffiliation{\nolinkurl{##2}}%
1723 \else
1724 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
1725 \fi}%
1726 \def\affiliation##1##2{\ifx\@currentaffiliation\empty
1727 \gdef\@currentaffiliation{##2}%
1728 \else
1729 \g@addto@macro\@currentaffiliation{\par##2}%
1730 \fi
1731 \global\let\and\@typeset@author@bx}%
1732 %

```

Actual typesetting is done by \and macro

```

1733 \bgroup\hsize=\columnwidth
1734 \par\raggedright\leftskip=\z@
1735 \lineskip=1pc\noindent
1736 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\@authornotemark Adding footnote mark to authors

```

1737 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark}}

```

\@mkteasers Typesetting teasers

```

1738 \def\@mkteasers{%
1739 \ifx\@teaserfigures\empty\else
1740 \def\@teaser##1{\par\bigskip\bgroup
1741 \captionsetup{type=figure}##1\egroup\par}
1742 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
1743 \noindent\@teaserfigures\par\medskip}%
1744 \fi}

```

\@setaddresses This is an amsart macro, which we do not need.

```
1745 \def\@setaddresses{}
```

\@mkabstract Typesetting abstract

```
1746 \def\@mkabstract{\bgroup
1747   \ifx\@abstract\@empty\else
1748   {\if@ACM@journal
1749     \small\noindent
1750   \else
1751     \section*{Abstract}%
1752   \fi
1753   \phantomsection\addcontentsline{toc}{section}{Abstract}%
1754   \ignorespaces\@abstract\par}%
1755 \fi\egroup}
```

\@mkbibcitation Print bibcitation format

```
1756 \def\@mkbibcitation{\bgroup
1757   \def\footnotemark{}}%
1758   \par\medskip\small\noindent{\bfseries ACM Reference format:}\par\nobreak
1759   \noindent\authors. \@acmYear. \@title.
1760   \if@ACM@journal
1761     \textit{\@journalNameShort}
1762     \@acmVolume, \@acmNumber, Article~\@acmArticle\ (\@acmPubDate),
1763     \ref{TotPages}~pages.
1764   \else
1765     In \textit{Proceedings of \@acmConference@name, \@acmConference@venue,
1766       \@acmConference@date
1767       \ifx\@acmConference@name\@acmConference@shortname\else
1768         \ (\@acmConference@shortname)\fi
1769       ,} \ref{TotPages}~pages.
1770   \fi\par
1771   \noindent DOI: \nolinkurl{\@acmDOI}
1772 \par\egroup}
```

\@printendtopmatter End the top matter

```
1773 \def\@printendtopmatter{\par\medskip
1774   \ifcase\ACM@format@nr
1775   \relax % manuscript
1776   \noindent\hrulefill\par\medskip
1777   \or % acmsmall
1778   \noindent\hrulefill\par\medskip
1779   \or % acmlarge
1780   \noindent\hrulefill\par\medskip
1781   \or % acmtog
1782   \par\bigskip
1783   \or % sigconf
1784   \par\bigskip
1785   \or % siggraph
1786   \par\bigskip
```

```

1787 \or % sigplan
1788 \par\bigskip
1789 \or % sigchi
1790 \par\bigskip
1791 \or % sigchi-a
1792 \fi
1793 }

```

\setthanks We redefine \setthanks using \long

```

1794 \def\setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

3.13 Headers and Footers

We use fancyhdr for our headers and footers:

```

1795 \RequirePackage{fancyhdr}

```

\ACM@linecount@bx This is the box displayed in the review mode

```

1796 \if@ACM@review
1797 \newsavebox{\ACM@linecount@bx}
1798 \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
1799 \newlength\ACM@linecount@bxht\setlength{\ACM@linecount@bxht}{-\baselineskip}
1800 \@tempcnta\@ne\relax
1801 \loop{\color{ACMRed}\scriptsize\the\@tempcnta}\@tempcnta\@ne
1802 \advance\@tempcnta by \@ne
1803 \addtolength{\ACM@linecount@bxht}{\baselineskip}
1804 \ifdim\ACM@linecount@bxht<\textheight\repeat}}
1805 \fi

```

\ACM@linecount How to display the box

```

1806 \def\ACM@linecount{%
1807 \if@ACM@review
1808 \begin{picture}(0,0)%
1809 \put(-26,-22){\usebox{\ACM@linecount@bx}}%
1810 \end{picture}%
1811 \fi}

```

\@shortauthors Even if the author redefined \shortauthors, we do not print them in the anonymous mode in the headers:

```

1812 \def\@shortauthors{\if@ACM@anonymous Anon.\else\shortauthors\fi}

```

\@headfootfont The font to typeset header and footer text.

```

1813 \def\@headfootfont{%
1814 \ifcase\ACM@format@nr
1815 \relax % manuscript
1816 \sffamily
1817 \or % acmsmall
1818 \sffamily
1819 \or % acmlarge

```



```

1820 \sffamily
1821 \or % acmtog
1822 \sffamily
1823 \or % sigconf
1824 \sffamily
1825 \or % siggraph
1826 \sffamily
1827 \or % sigplan
1828 \sffamily
1829 \or % sigchi
1830 \sffamily
1831 \or % sigchi-a
1832 \sffamily
1833 \fi}

```

standardpagestyle The pagestyle for all pages but the first one

```

1834 \fancypagestyle{standardpagestyle}{%
1835 \fancyhf{}%
1836 \renewcommand{\headrulewidth}{\z@}%
1837 \renewcommand{\footrulewidth}{\z@}%
1838 \ifcase\ACM@format@nr
1839 \relax % manuscript
1840 \fancyhead[LE]{\ACM@linecount\if@ACM@printfolios\thepage\fi}%
1841 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
1842 \fancyhead[RE]{\@shortauthors}%
1843 \fancyhead[LO]{\ACM@linecount\shorttitle}%
1844 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
1845 \or % acmsmall
1846 \fancyhead[LE]{\ACM@linecount\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1847 \fancyhead[RO]{\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1848 \fancyhead[RE]{\@headfootfont\@shortauthors}%
1849 \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
1850 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1851 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
1852 \or % acmlarge
1853 \fancyhead[LE]{\ACM@linecount\@headfootfont
1854 \@acmArticle:\if@ACM@printfolios\thepage\quad\textbullet\quad\fi\@shortauthors}%
1855 \fancyhead[LO]{\ACM@linecount}%
1856 \fancyhead[RO]{\@headfootfont
1857 \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1858 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1859 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
1860 \or % acmtog
1861 \fancyhead[LE]{\ACM@linecount\@headfootfont
1862 \@acmArticle:\if@ACM@printfolios\thepage\quad\textbullet\quad\fi\@shortauthors}%
1863 \fancyhead[LO]{\ACM@linecount}%
1864 \fancyhead[RO]{\@headfootfont
1865 \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1866 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1867 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%

```

```

1868 \else % Proceedings
1869 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
1870 \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
1871 \fancyhead[RE]{\@headfootfont\@shortauthors}%
1872 \fancyhead[LE]{\ACM@linecount\@headfootfont\acmConference@shortname,
1873 \acmConference@date, \acmConference@venue}%
1874 \fancyhead[RO]{\@headfootfont\acmConference@shortname,
1875 \acmConference@date, \acmConference@venue}%
1876 \fi
1877 \if@ACM@sigchiamode
1878 \fancyheadoffset[L]{\dimexpr\marginparsep+\marginparwidth}%
1879 \fi
1880 }
1881 \pagestyle{standardpagestyle}

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht
\@folio@voffset
\@folio@max
1882 \newdimen\@folio@wd
1883 \@folio@wd=\z@
1884 \newdimen\@folio@ht
1885 \@folio@ht=\z@
1886 \newdimen\@folio@voffset
1887 \@folio@voffset=\z@
1888 \def\@folio@max{1}
1889 \ifcase\ACM@format@nr
1890 \relax % manuscript
1891 \or % acmsmall
1892 \@folio@wd=45.75pt\relax
1893 \@folio@ht=1.25in\relax
1894 \@folio@voffset=.2in\relax
1895 \def\@folio@max{8}
1896 \or % acmlarge
1897 \@folio@wd=43.25pt\relax
1898 \@folio@ht=79pt\relax
1899 \@folio@voffset=.55in\relax
1900 \def\@folio@max{10}
1901 \fi

\@folioblob The macro to typeset the folio blob.
1902 \def\@folioblob{\@tempcnta=\@acmArticleSeq\relax
First, we calculate \@acmArticleSeq modulo \@folio@max
1903 \loop
1904 \ifnum\@tempcnta>\@folio@max\relax
1905 \advance\@tempcnta by - \@folio@max
1906 \repeat
1907 \advance\@tempcnta by -1\relax
1908 \@tempdima=\@folio@ht\relax
1909 \multiply\@tempdima by \the\@tempcnta\relax
1910 \advance\@tempdima by -\@folio@voffset\relax
1911 \begin{picture}(0,0)

```

```

1912 \makebox[\z@]{\raisebox{-\@tempdima}{%
1913     \rlap{%
1914         \raisebox{-0.45\@folio@ht}{\z@}{\z@}{%
1915             \rule{\@folio@wd}{\@folio@ht}}}%
1916     \parbox{\@folio@wd}{%
1917         \centering
1918         \textcolor{white}{\LARGE\bfseries\sffamily\@acmArticle}}}%
1919 \end{picture}}
1920

```

firstpagestyle The pagestyle for the first page only.

```

1921 \fancypagestyle{firstpagestyle}{%
1922     \fancyhf{}%
1923     \renewcommand{\headrulewidth}{\z@}%
1924     \renewcommand{\footrulewidth}{\z@}%
1925     \ifcase\ACM@format@nr
1926     \relax % manuscript
1927         \fancyhead[L]{\ACM@linecount}%
1928         \fancyfoot[R0,LE]{\if@ACM@printfolios\small\thepage\fi}%
1929         \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
1930     \or % acmsmall
1931         \fancyfoot[R0,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1932             \@acmNumber, Article \@acmArticle. Publication date:
1933             \@acmPubDate.}%
1934         \fancyhead[LE]{\ACM@linecount\@folioblob}%
1935         \fancyhead[LO]{\ACM@linecount}%
1936         \fancyhead[R0]{\@folioblob}%
1937         \fancyheadoffset[R0,LE]{0.6\@folio@wd}%
1938     \or % acmlarge
1939         \fancyfoot[R0,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1940             \@acmNumber, Article \@acmArticle. Publication date:
1941             \@acmPubDate.}%
1942         \fancyhead[R0]{\@folioblob}%
1943         \fancyhead[LE]{\ACM@linecount\@folioblob}%
1944         \fancyhead[LO]{\ACM@linecount}%
1945         \fancyheadoffset[R0,LE]{1.4\@folio@wd}%
1946     \or % acmtog
1947         \fancyfoot[R0,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1948             \@acmNumber, Article \@acmArticle. Publication date:
1949             \@acmPubDate.}%
1950         \fancyhead[L]{\ACM@linecount}%
1951     \else % Conference proceedings
1952         \fancyhead[L]{\ACM@linecount}%
1953         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
1954     \fi
1955 }

```

3.14 Sectioning

Sectioning is different for different levels

```

1956 \renewcommand\section{\@startsection{section}{1}{\z@}%
1957   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1958   {.25\baselineskip}%
1959   {\@secfont}}
1960 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
1961   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1962   {.25\baselineskip}%
1963   {\@subsecfont}}
1964 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{10pt}%
1965   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1966   {-3.5\p@}%
1967   {\@subsubsecfont\@adddotafter}}
1968 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
1969   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1970   {-3.5\p@}%
1971   {\@parfont\@adddotafter}}
1972 \renewcommand\part{\@startsection{part}{9}{\z@}%
1973   {-10\p@ \@plus -4\p@ \@minus -2\p@}%
1974   {4\p@}%
1975   {\@parfont}}

```

\section@raggedright Special version of \raggedright compatible with \MakeUppercase

```

1976 \def\section@raggedright{\@rightskip\@flushglue
1977   \rightskip\@rightskip
1978   \leftskip\z@skip
1979   \parindent\z@}

```

\@secfont Fonts for sections etc. are different for different formats.

```

\@subsecfont 1980 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeUppercase}
\@subsubsecfont 1981 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 1982 \def\@subsubsecfont{\sffamily\itshape}
1983 \def\@parfont{\itshape}
1984 \setcounter{secnumdepth}{3}
1985 \ifcase\ACM@format@nr
1986 \relax % manuscript
1987 \or % acmsmall
1988 \or % acmlarge
1989 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
1990 \def\@subsecfont{\sffamily\large\section@raggedright}
1991 \or % acmtog
1992 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
1993 \def\@subsecfont{\sffamily\large\section@raggedright}
1994 \or % sigconf
1995 \def\@secfont{\bfseries\Large\section@raggedright\MakeUppercase}
1996 \def\@subsecfont{\bfseries\Large\section@raggedright}
1997 \or % siggraph
1998 \def\@secfont{\bfseries\sffamily\Large\section@raggedright\MakeUppercase}

```

```

1999 \def\@subsecfont{\bfseries\sffamily\Large\section@raggedright}
2000 \or % sigplan
2001 \def\@secfont{\bfseries\Large\section@raggedright}
2002 \def\@subsecfont{\bfseries\section@raggedright}
2003 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2004   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2005   {.25\baselineskip}%
2006   {\@subsubsecfont}}
2007 \def\@subsubsecfont{\bfseries\section@raggedright}
2008 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
2009   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2010   {-3.5\p@}%
2011   {\@parfont\@addspaceafter}}
2012 \def\@parfont{\bfseries\itshape}
2013 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
2014   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2015   {-3.5\p@}%
2016   {\@subparfont\@addspaceafter}}
2017 \def\@subparfont{\itshape}
2018 \or % sigchi
2019 \setcounter{secnumdepth}{1}
2020 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
2021 \def\@subsecfont{\bfseries\sffamily\section@raggedright}
2022 \or % sigchi-a
2023 \setcounter{secnumdepth}{0}
2024 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
2025 \def\@subsecfont{\bfseries\sffamily\section@raggedright}
2026 \fi

```

\@adddotafter Add punctuation after the command

```
2027 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after the command

```
2028 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.15 Theorems

\@acmplainbodyfont The font to typeset the acmplain theorem style body.

```
2029 \def\@acmplainbodyfont{\itshape}
```

\@acmplainindent The amount to indent the acmplain theorem style.

```
2030 \def\@acmplainindent{\parindent}
```

\@acmplainheadfont The font to typeset the acmplain theorem style head.

```
2031 \def\@acmplainheadfont{\scshape}
```

\@acmplainnotefont The font to typeset the acmplain theorem style note.

```
2032 \def\@acmplainnotefont{\@empty}
```

Customization of acmplain theorem style:

```

2033 \ifcase\ACM@format@nr
2034 \relax % manuscript
2035 \or % acmsmall
2036 \or % acmlarge
2037 \or % acmtog
2038 \or % sigconf
2039 \or % siggraph
2040 \or % sigplan
2041 \def\@acmplainbodyfont{\itshape}
2042 \def\@acmplainindent{\z@}
2043 \def\@acmplainheadfont{\bfseries}
2044 \def\@acmplainnotefont{\normalfont}
2045 \or % sigchi
2046 \or % sigchi-a
2047 \fi

```

acmplain The acmplain theorem style

```

2048 \newtheoremstyle{acmplain}%
2049 { .5\baselineskip \@plus.2\baselineskip
2050   \@minus.2\baselineskip}% space above
2051 { .5\baselineskip \@plus.2\baselineskip
2052   \@minus.2\baselineskip}% space below
2053 {\@acmplainbodyfont}% body font
2054 {\@acmplainindent}% indent amount
2055 {\@acmplainheadfont}% head font
2056 { .}% punctuation after head
2057 { .5em}% spacing after head
2058 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont{#3}}}}% head spec

```

\@acmdefinitionbodyfont The font to typeset the acmdefinition theorem style body.

```
2059 \def\@acmdefinitionbodyfont{\normalfont}
```

\@acmdefinitionindent The amount to indent the acmdefinition theorem style.

```
2060 \def\@acmdefinitionindent{\parindent}
```

\@acmdefinitionheadfont The font to typeset the acmdefinition theorem style head.

```
2061 \def\@acmdefinitionheadfont{\itshape}
```

\@acmdefinitionnotefont The font to typeset the acmdefinition theorem style note.

```
2062 \def\@acmdefinitionnotefont{\@empty}
```

Customization of acmdefinition theorem style:

```

2063 \ifcase\ACM@format@nr
2064 \relax % manuscript
2065 \or % acmsmall
2066 \or % acmlarge
2067 \or % acmtog
2068 \or % sigconf

```

```

2069 \or % siggraph
2070 \or % sigplan
2071 \def\acmdefinitionbodyfont{\normalfont}
2072 \def\acmdefinitionindent{\z@}
2073 \def\acmdefinitionheadfont{\bfseries}
2074 \def\acmdefinitionnotefont{\normalfont}
2075 \or % sigchi
2076 \or % sigchi-a
2077 \fi

acmdefinition The acmdefinition theorem style
2078 \newtheoremstyle{acmdefinition}%
2079 { .5\baselineskip \@plus.2\baselineskip
2080   \@minus.2\baselineskip}% space above
2081 { .5\baselineskip \@plus.2\baselineskip
2082   \@minus.2\baselineskip}% space below
2083 {\acmdefinitionbodyfont}% body font
2084 {\acmdefinitionindent}% indent amount
2085 {\acmdefinitionheadfont}% head font
2086 { .}% punctuation after head
2087 { .5em}% spacing after head
2088 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\acmdefinitionnotefont{#3}}}}% head spec

The definitions for theorems:
2089 \theoremstyle{acmplain}
2090 \newtheorem{theorem}{Theorem}[section]
2091 \newtheorem{conjecture}[theorem]{Conjecture}
2092 \newtheorem{proposition}[theorem]{Proposition}
2093 \newtheorem{lemma}[theorem]{Lemma}
2094 \newtheorem{corollary}[theorem]{Corollary}
2095 \theoremstyle{acmdefinition}
2096 \newtheorem{example}[theorem]{Example}
2097 \newtheorem{definition}[theorem]{Definition}
2098 \theoremstyle{acmplain}

\@proofnamefont The font to typeset the proof name.
2099 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
2100 \def\@proofindent{\indent}

Customization of proof environment.
2101 \ifcase\ACM@format@nr
2102 \relax % manuscript
2103 \or % acmsmall
2104 \or % acmlarge
2105 \or % acmtog
2106 \or % sigconf
2107 \or % siggraph

```

```

2108 \or % sigplan
2109 \def\@proofnamefont{\itshape}
2110 \def\@proofindent{\noindent}
2111 \or % sigchi
2112 \or % sigchi-a
2113 \fi

proof We want some customization of proof environment.

2114 \renewenvironment{proof}[1][\proofname]{\par
2115 \pushQED{\qed}%
2116 \normalfont \topsep6\p@\@plus6\p@\relax
2117 \trivlist
2118 \item[\@proofindent\hskip\labelsep
2119 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2120 }{%
2121 \popQED\endtrivlist\@endpfalse
2122 }

```

3.16 Acknowledgments

```

\acks This is a comment-like structure

2123 \specialcomment{acks}{%
2124 \begingroup
2125 \section*{Acknowledgments}
2126 \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
2127 }{%
2128 \endgroup
2129 }

```

\grantsponsor We just typeset the name of the sponsor

```

2130 \def\grantsponsor#1#2#3{#2}

```

\grantnum

```

2131 \newcommand\grantnum[3][\]{#3%
2132 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.17 Conditional typesetting

We use the comment package for conditional typesetting:

```

2133 \if@ACM@screen
2134 \includecomment{screenonly}
2135 \excludecomment{printonly}
2136 \else
2137 \excludecomment{screenonly}
2138 \includecomment{printonly}
2139 \fi
2140 \if@ACM@anonymous
2141 \excludecomment{anonsuppress}

```



```
2142 \excludecomment{acks}  
2143 \else  
2144 \includecomment{anonsuppress}  
2145 \fi
```

3.18 End of Class

```
2146 \normalsize\normalfont  
2147 \end{class}
```

References

- [1] UK T_EX Users Group. UK list of T_EX frequently asked questions. <http://www.tex.ac.uk>, 2016.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes*. American Mathematical Society, August 2004. <http://www.ctan.org/pkg/amslatex>.
- [3] Cristophe Fiorio. *algorithm2e.sty—package for algorithms*, October 2015.
- [4] Rogério Brito. *The algorithms bundle*, August 2009.
- [5] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. <http://www.ctan.org/pkg/listings>.
- [6] Simon Fear. *Publication quality tables in L^AT_EX*, April 2005. <http://www.ctan.org/pkg/booktabs>.
- [7] Association for Computing Machinery. *ACM Visual Identity Standards*, 2007.
- [8] Axel Sommerfeldt. *The subcaption package*, April 2013. <http://www.ctan.org/pkg/subcaption>.
- [9] Boris Veytsman, Bern Schandl, Lee Netherton, and CV Radhakrishnan. *A package to create a nomenclature*, September 2005. <http://www.ctan.org/pkg/nomencl>.
- [10] Nicola L. C. Talbot. *User Manual for glossaries.sty v4.25*, June 2016. <http://www.ctan.org/pkg/subcaption>.

Change History

v1.00	General: First released version	20	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	20
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1)	20		Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19	20
	Defined ACM colors	20	v1.06	\@ACM@badge@skip: Added macro . . .	43
	Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4)	22		\@ACM@badge@width: Added macro . .	43
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5)	20		\@ACM@title@width: Added macro . .	43
v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12)	20		\@mktitle@i: Added processing badges	56
	Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13)	20		Made generic	56
v1.03	\@formatdoi: Added macro	48		\@mktitle@ii: Now this macro is obsolete	56
	\if@ACM@authorversion: Added macro	21		\@mktitle@iii: Added processing badges	56
	\maketitle: Added special case of authorversion	51		Made more generic	56
	General: Added anon suppress environment	20		\@mktitle@iv: Made more generic . .	57
	Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9)	20		\@printtopmatter: Added processing badges	53
v1.04	\acmArticleSeq: Name change by Matthew Fluet	43		\@subtitlefont: Added macro	55
	\acmDOI: Name change by Matthew Fluet	43		\@titlefont: Added macro	55
	\acmISBN: Name change by Matthew Fluet	43		\acmBadgeL: Added macro	44
	General: Updated bibliography for siggraph	20		\acmBadgeR: Added macro	44
				\if@ACM@badge: Added macro	43
			v1.07	\maketitle: Corrected a bug with abstract footnotes	51
				Corrected a bug with permission and footnotes order	51
			v1.08	General: SIGPLAN reformatting by Matthew Fluet	20
				Typos corrected (Tobias Pape) . . .	20
			v1.09	General: Revert SIGPLAN caption rules	20
			v1.10	\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	51

General: Changes of	v1.14
‘licensedothergov’ wording	46
standardpagestyle: Reversed folios	
location	65
v1.11	
General: Customization of ACM	
theorem styles and proof	
environment by Matthew Fluet . .	20
v1.12	
\@marginfigure: Now centering by	
default	33
\@marginfigure: Now centering by	
default	34
\@parfont: Moved to	
\section@raggedright	68
\copyrightpermissionfootnoterule:	
Added macro	31
\descriptionlabel: Redefined . . .	35
\footnoterule: Made shorter	31
\if@ACM@natbib@override: Added	
macro	21
\if@ACM@newfonts: Added macro . .	32
\maketitle: Moved thanks to	
copyrightpermission box	51
\section@raggedright: Introduced	
macro	68
General: Added graceful behavior	
when libertine fonts are absent . .	32
Documentation updates	20
v1.13	
\@mpfootnotetext: Made minipage	
footnotes centered	32
\bibliographystyle: Redefined	
macro	29
\bibstyle@acmauthoryear: Added	
macro	25
\bibstyle@acmnumeric: Added	
macro	26
\if@ACM@printfolios: Added macro	45
General: Font adjustments for	
acmsmall	59
Increased font size for ACM Large	23
Print bibliographic information by	
default for the proceedings	45
standardpagestyle: Added headers	
for sigs	65
Expanded headers for sigchi-a . . .	65
Suppressed folios if sig	65
\bibstyle@acmauthoryear: Moved	
def of \bibstyle@acmauthoryear	
before use	25
\bibstyle@acmnumeric: Moved def of	
\bibstyle@numeric before use . .	26
General: \citestyle updates	
(Matthew Fluet)	20
Patched \citestyle	24
v1.15	
\@ACM@addtoaddress: Added macro	57
\@mkauthors@iii: New authors	
system	60
\@shortauthors: Introduced macro .	64
\@typeset@author@bx: Moved to	
separate macro	60
\acks: Added macro	72
\affiliation: Added code for author	
groups	41
\author: Added code for author	
groups	40
\city: Added macro	57
\country: Added macro	57
\department: Added macro	57
\grantnum: Added macro	72
\grantsponsor: Added macro	72
\if@insideauthorgroup: Introduced	
macro	40
\institution: Added macro	57
\num@authorgroups: Renamed	40
\orcid: Introduced macro	41
\position: Added macro	57
\postcode: Added macro	57
\state: Added macro	57
\streetaddress: Added macro	57
standardpagestyle: Better handling	
of anonymous mode	65
v1.16	
\@headfootfont: Added macro	64
General: Formatting header/footer	
(Matthew Fluet)	20
standardpagestyle: Customize	
header/footer text font	65
v1.17	
\@makefnmark: Redefined	32
\@mkauthors: TOG now uses the same	
authors block as other journals . .	58
\@mkauthors@ii: Deleted	60
\@mkbibcitation: Added \nobreak	63
Changed format for sigs	63

\acmArticle: The default is now numerical	42	affiliations	59
\acmMonth: The default must be numerical. Closes #50.	43	\@typeset@author@line: Added macro	59
\acmNumber: The default is now numerical	42	General: Natbib is now the default for all formats	20
\acmVolume: The default is now numerical	42	v1.19	
\acmYear: The default is now numerical	43	\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) .	63
\description: Decreased indent . . .	35	\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) .	72
\grantnum: Added url	72	General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	20
\grantsponsor: Renamed	72	Include 'References' in PDF bookmarks (Matthew Fluet)	24
\if@ACM@printacmref: Renamed from \if@ACM@printbib	45	v1.20	
General: Slightly decreased margins for sigs	29	\@mkabstract: Deleted spurious space	63
standardpagestyle: Added paper title to sigs	65	General: Bug fixes for bst	20
v1.18			
\@mkauthors@i: Now we andify			

Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

Symbols		
\\$ 1305, 1309	\@DeclareACMFormat 33, 34, 35, 36, 37, 38, 39, 40, 41, 42	\@acmdefinitionheadfont <u>2061</u> , 2073, 2085
\@ 1101, 1104, 1109, 1113, 1116, 1119, 1121, 1124, 1204, 1211, 1224	\@M 279, 312, 330	\@acmdefinitionindent <u>2060</u> , 2072, 2084
\@@par 279, 330	\@abstract . 988, 1747, 1754	\@acmdefinitionnotefont <u>2062</u> , 2074, 2088
\@ACM@addtoaddress <u>1541</u> , 1562, 1563, 1565	\@acmArticle 946, 949, 1304, 1762, 1846, 1847, 1851, 1854, 1857, 1859, 1862, 1865, 1867, 1918, 1932, 1940, 1948	\@acmownedfalse . 1068, 1071, 1074, 1079, 1082, 1085, 1088, 1094
\@ACM@badge@skip <u>969</u> , 1404, 1481, 1485, 1491, 1500, 1510, 1516, 1525	\@acmArticleSeq . 948, 1902	\@acmownedtrue 1057, 1064, 1091
\@ACM@badge@width <u>966</u> , 1403, 1408, 1480, 1484, 1490, 1502, 1509, 1511, 1514, 1526, 1529	\@acmBadgeL@image 978, 980, 1401, 1403, 1479, 1488, 1490, 1512, 1514	\@acmplainbodyfont <u>2029</u> , 2041, 2053
\@ACM@badgefalse 965	\@acmBadgeL@url . 977, 979, 1402, 1489, 1513	\@acmplainheadfont <u>2031</u> , 2043, 2055
\@ACM@badgetrue . 971, 976	\@acmBadgeR@image 973, 975, 1406, 1408, 1483, 1499, 1502, 1527, 1529	\@acmplainindent <u>2030</u> , 2042, 2054
\@ACM@commabox 1541, 1544, 1545	\@acmBadgeR@url . 972, 974, 1407, 1501, 1528	\@acmplainnotefont <u>2032</u> , 2044, 2058
\@ACM@journalfalse 114, 116, 118, 120, 122	\@acmDOI 962, 1297, 1300, 1306, 1310, 1771	\@adddotafter 1967, 1971, <u>2027</u>
\@ACM@journaltrue 106, 108, 110, 112	\@acmISBN 960, 1308	\@addpunct 1794, 2027, 2028, 2119
\@ACM@manuscriptfalse 101	\@acmMonth . 952, 954, 1304	\@addspaceafter 2011, 2016, <u>2028</u>
\@ACM@manuscripttrue 99	\@acmNumber 944, 1762, 1851, 1859, 1867, 1932, 1940, 1948	\@affiliationfont <u>1592</u> , 1597, 1601, 1604, 1607, 1610, 1613, 1616, 1641, 1657
\@ACM@natbib@overridefalse 69	\@acmPrice . 958, 1305, 1309	\@afterheading . 304, 1346
\@ACM@natbib@overridetrue 71	\@acmPubDate <u>954</u> , 1762, 1851, 1859, 1867, 1933, 1941, 1949	\@afterindentfalse 257, 1345
\@ACM@natbibtrue 126	\@acmVolume 942, 1762, 1850, 1858, 1866, 1931, 1939, 1947	\@afterindenttrue 255
\@ACM@newfontfalse 513, 515, 518	\@acmYear 950, 957, 1232, 1304, 1759	\@author 875, 878, 883, 1630, 1680, 1715
\@ACM@newfontstrue . 510	\@acmdefinitionbodyfont <u>2059</u> , 2071, 2083	\@authorfont <u>1591</u> , 1596, 1600, 1603, 1606, 1609, 1612, 1615, 1632, 1657
\@ACM@sigchiamodeffalse 103		\@authornotemark <u>938</u> , <u>1737</u>
\@ACM@sigchiamodetrue 123		\@authornotes <u>935</u> , 939, 1264
\@ACM@title@width <u>968</u> , 1478, 1480, 1481, 1484, 1485, 1493, 1507, 1509, 1510, 1518		\@auxout 383
		\@begindocumenthook 379

<code>\@citestyle</code>	191	1680, 1686, 1691,	<code>\@journalName</code>
<code>\@classname</code>	25, 30, 46,	1715, 1721, 1726,	664, 668, 672, 676,
	48, 49, 54, 56, 57,	1739, 2032, 2062, 2132	680, 684, 688, 692,
	62, 64, 65, 73, 75,	<code>\@endfloatbox</code>	693, 695, 699, 703,
	76, 80, 82, 83, 94,	<code>\@endpefalse</code>	705, 709, 713, 715,
	150, 511, 514, 516,	<code>\@endwidefloatbox</code> 572, 580	717, 719, 723, 727,
	844, 846, 993, 995,	<code>\@finalstrut</code>	731, 735, 739, 743,
	996, 999, 1001,	<code>\@float</code>	747, 751, 755, 759,
	1002, 1005, 1007, 1008	<code>\@flushglue</code>	763, 767, 771, 775,
<code>\@clubpenalty</code>	318	<code>\@fnsymbol</code>	776, 779, 783, 784,
<code>\@concepts</code>	1041,	<code>\@folio@ht</code>	787, 792, 796, 800,
	1047, 1318, 1320, 1343		804, 808, 812, 816,
<code>\@copyrightowner</code>	1098, 1281	<code>\@folio@max</code> 1882, 1904, 1905	820, 824, 828, 832,
<code>\@copyrightpermission</code>	1127, 1273	<code>\@folio@voffset</code> 1882, 1910	836, 840, 850, 851,
<code>\@copyrightyear</code>	1231, 1281, 1283	<code>\@folio@wd</code>	1293, 1850, 1858,
<code>\@currbox</code>	586, 587, 588		1866, 1931, 1939, 1947
<code>\@currentaffiliation</code>	1658, 1661, 1679,	<code>\@folioblob</code>	<code>\@journalNameShort</code>
	1686, 1687, 1689,		665, 669,
	1691, 1692, 1694,	<code>\@footnotemark</code>	673, 677, 681, 685,
	1714, 1721, 1722,	<code>\@footnotemark@nolink</code>	689, 696, 700, 706,
	1724, 1726, 1727, 1729		710, 720, 724, 728,
<code>\@currentaffiliations</code>	1621,	<code>\@footnotetext</code>	732, 736, 740, 744,
	1622, 1623, 1625,		748, 752, 756, 760,
	1628, 1640, 1641, 1643	<code>\@footnotetext@nolink</code>	764, 768, 772, 780,
<code>\@currentauthors</code>	1619,		785, 788, 793, 797,
	1620, 1627, 1631,	<code>\@for</code>	801, 805, 809, 813,
	1632, 1634, 1657,	<code>\@formatdoi</code>	817, 821, 825, 829,
	1660, 1678, 1680,	<code>\@fps</code>	833, 837, 841, 851, 1761
	1681, 1683, 1713,	<code>\@fpsadddefault</code>	<code>\@keywords</code>
	1715, 1716, 1718, 1737	<code>\@gobble</code>	985, 1327, 1333
<code>\@currentlabel</code>	488, 502		<code>\@latex@error</code>
<code>\@dblarg</code>	266	<code>\@hangfrom</code>	990, 1747
<code>\@dblfloat</code>	570		<code>\@makefnmark</code>
<code>\@empty</code>	128, 269, 859, 873,	<code>\@headfootfont</code>	483, 1256, 1261, 1265
	888, 893, 894, 900,		<code>\@makefntext</code>
	1022, 1023, 1029,		483, 492, 505, 1266
	1036, 1041, 1267,	<code>\@ifnotempty</code>	<code>\@marginfigure</code>
	1297, 1309, 1318,	<code>\@ifnum</code>	562, 563
	1323, 1327, 1370,	<code>\@ifstar</code>	<code>\@margintable</code>
	1401, 1406, 1479,	<code>\@iiiparbox</code>	565, 566
	1483, 1488, 1496,	<code>\@insideauthorgroupfalse</code>	<code>\@minipagefalse</code>
	1499, 1512, 1520,		479, 582
	1527, 1537, 1621,	<code>\@insideauthorgrouptue</code>	<code>\@minus</code>
	1631, 1639, 1640,		1957, 1961,
		<code>\@journalCode</code>	1965, 1969, 1973,
		<code>\@journalCode@nr</code>	2004, 2009, 2014,
			2050, 2052, 2080, 2082
			<code>\@mkabstract</code>
			1316, 1746
			<code>\@mkauthors</code> 1257, 1259, 1567
			<code>\@mkauthors@i</code>
			1571,
			<code>\@mkauthors@ii</code>
			1573, 1575, 1577, 1626
			<code>\@mkauthors@iii</code>
			1579,
			<code>\@mkauthors@iv</code>
			1581, 1583, 1585, 1662
			1587, 1703

<code>\@mkbibcitation</code>	1340, 1756	<code>\@printpermissiontrue</code>	174, 176, 178, 180,
<code>\@mkteasers</code>	1257, 1738	...	1055, 1062, 1077
<code>\@mktitle</code>	1257, 1413	<code>\@printtopmatter</code>	182, 184, 186, 188,
<code>\@mktitle@i</code>	1416,	...	190, 192, 194, 196,
1418, 1420, 1422, 1477	1258, 1369	<code>\@proofindent</code>	198, 200, 202, 204,
<code>\@mktitle@ii</code>	1505	...	206, 208, 210, 212,
<code>\@mktitle@iii</code>	1424,	...	215, 217, 219, 221,
1426, 1428, 1430, 1505	2100, 2110, 2118	<code>\@proofnamefont</code>	223, 225, 892, 893,
<code>\@mktitle@iv</code>	1432, 1533	...	1021, 1022, 1639, 2132
<code>\@mpargs</code>	482	<code>\@received</code>	1020, 1023,
<code>\@mparswitchfalse</code>	447	1024, 1026, 1029,	<code>\@tempb</code>
<code>\@mpfootins</code>	474, 475, 477, 497, 498	1030, 1032, 1036, 1037	168, 170, 172,
<code>\@mpfootnotetext</code>	496	<code>\@rightskip</code>	174, 176, 178, 180,
<code>\@ne</code>	193, 197, 201,	1976, 1977	182, 184, 186, 188,
203, 373, 1800, 1802	987, 988	<code>\@saveabstract</code>	190, 192, 194, 196,
<code>\@nil</code>	212	<code>\@saveteaser</code>	198, 200, 202, 204,
<code>\@nobreakfalse</code>	306	<code>\@seccntformat</code>	206, 208, 210, 215,
<code>\@noskipsecfalse</code>	310	272, 323	217, 219, 221, 223, 225
<code>\@noskipsectrue</code>	307	<code>\@secfont</code>	<code>\@tempboxa</code>
<code>\@par</code>	1269	1959, 1980	482
<code>\@parboxrestore</code>	501	<code>\@secpenalty</code>	<code>\@tempc</code>
<code>\@parfont</code>	1971, 1975, 1980	262	213, 214, 216,
<code>\@permissionCodeOne</code>	666, 670,	<code>\@sect</code>	218, 220, 222, 224, 226
674, 678, 682, 686,	690, 697, 701, 707,	<code>\@setaddresses</code>	<code>\@tempcnta</code>
711, 721, 725, 729,	733, 737, 741, 745,	1745	1800,
749, 753, 757, 761,	765, 769, 773, 777,	<code>\@setthanks</code>	1801, 1802, 1902,
781, 789, 794, 798,	802, 806, 810, 814,	1269, 1794	1904, 1905, 1907, 1909
818, 822, 826, 830,	834, 838, 842, 852, 1304	<code>\@shortauthors</code>	<code>\@tempdima</code>
<code>\@permissionCodeTwo</code>	790, 853	1812, 1842,	1908, 1909, 1910, 1912
<code>\@plus</code>	1957, 1961, 1965,	1848, 1854, 1862, 1871	<code>\@tempskipa</code>
1969, 1973, 2004,	2009, 2014, 2049,	<code>\@sidebar</code>	254, 256, 257, 262,
2051, 2079, 2081, 2116	1456, 1497, 1521, 1538	559, 560	274, 275, 300, 301,
<code>\@printcopyrightfalse</code>	925, 929, 932, 1263	<code>\@specialsection</code>	303, 315, 316, 325, 326
1067, 1078	1520, 1521, 1537, 1538	1319,	<code>\@terms</code>
<code>\@printcopyrighttrue</code>	1456, 1497, 1521, 1538	1324, 1329, 1331, 1348	983, 1323, 1325
1053, 1063	<code>\@subparfont</code>	265, 324	<code>\@textsuperscript</code>
<code>\@printendtopmatter</code>	1344, 1773	<code>\@startPage</code>	508, 1256, 1261
<code>\@printpermissionfalse</code>	167, 168, 170, 172,	981, 1370, 1371, 1373	<code>\@thefnmark</code>
1066	1696, 1702, 1731, 1736	<code>\@startsection</code>	489, 503,
	1618, 1629, 1646, 1648	251, 1956,	508, 1256, 1261, 1265
	1301, 1305, 1309, 1801	1960, 1964, 1968,	<code>\@title</code>
		1972, 2003, 2008, 2013	918, 1343,
		<code>\@subsecfont</code>	1495, 1519, 1536, 1759
		2016, 2017	<code>\@titlefont</code>
		1963, 1980	1435, 1487,
		<code>\@subsubsecfont</code>	1494, 1506, 1518, 1534
		1967, 1980	<code>\@titlenotes</code>
		<code>\@subtitle</code>	916, 920, 923, 1262
		864,	<code>\@topnum</code>
		927, 1496, 1497,	1253
		1520, 1521, 1537, 1538	<code>\@typeset@author@bx</code>
		<code>\@subtitlefont</code>	1655,
		1456, 1497, 1521, 1538	1696, 1702, 1731, 1736
		<code>\@subtitlenotes</code>	<code>\@typeset@author@line</code>
		925, 929, 932, 1263	1618, 1629, 1646, 1648
		<code>\@svsec</code>	<code>\@undefined</code>
		269, 272, 278, 290	379
		<code>\@svsechd</code>	<code>\@width</code>
		288, 313, 333	465, 470
		<code>\@teaser</code>	<code>\@xsect</code>
		1235, 1740	298, 299, 335
		<code>\@teaserfigures</code>	<code>\@z</code>
		1233, 1235, 1739, 1743	199
		<code>\@tempa</code>	<code>\@</code>
		167, 168, 170, 172,	1286,
			1301, 1305, 1309, 1801

\{	175	\acmConference@name	\author@bx@wd
\}	175	856, 1295, 1765, 1767	1652, 1655, 1663,
		\acmConference@shortname	1664, 1669, 1671,
		855,	1673, 1675, 1677,
_	1281,	859, 860, 1277,	1704, 1705, 1710, 1712
	1283, 1304, 1762, 1768	1767, 1768, 1872, 1874	\authornote
		\acmConference@venue	11, 936
		858,	\authors
		1277, 1765, 1873, 1875	876, 879, 884,
			1335, 1337, 1342, 1759
A			
\abstract	987	\acmdefinition	B
abstract (environment)	14	2078	\baselineskip
\acks	2123	\acmDOI	1271, 1489, 1501,
acks (environment)	18	12, 962	1513, 1528, 1799,
\acm@copyrightinput	1059	\acmISBN	1803, 1957, 1958,
\acm@copyrightmode		7, 848	1961, 1962, 1965,
1059, 1065,		\acmMonth	1969, 2004, 2005,
1070, 1073, 1076,		11, 952	2009, 2014, 2049,
1081, 1084, 1087,		\acmNumber	2050, 2051, 2052,
1090, 1093, 1099, 1128		11, 944	2079, 2080, 2081, 2082
\ACM@fontsize		\acmplain	\begin
86, 128, 131, 133,		2048	20, 1808, 1911
135, 137, 139, 141,		\acmPrice	\begingroup
143, 145, 147, 150, 151		11, 958	276, 313, 327,
\ACM@format	27, 94	\acmVolume	372, 1249, 1567, 2124
\ACM@format@nr	27, 94,	11, 942	\bfseries
98, 104, 129, 340,		\acmYear	605,
395, 452, 538, 590,		11, 950	1438, 1440, 1442,
1349, 1377, 1414,		\addcontentsline	1446, 1448, 1450,
1436, 1457, 1569,		163,	1452, 1454, 1612,
1593, 1774, 1814,		282, 292, 1753, 2126	1615, 1758, 1918,
1838, 1889, 1925,		\addpenalty	1980, 1981, 1995,
1985, 2033, 2063, 2101		262	1996, 1998, 1999,
\ACM@linecount		\addresses	2001, 2002, 2007,
1806, 1840,		873, 875,	2012, 2020, 2021,
1843, 1846, 1849,		878, 883, 910, 914,	2024, 2025, 2043, 2073
1853, 1855, 1861,		938, 1648, 1702, 1736	\bgroup
1863, 1870, 1872,		\addtolength	560, 563,
1927, 1934, 1935,		1803	566, 571, 1318,
1943, 1944, 1950, 1952		\addvspace	1323, 1327, 1655,
\ACM@linecount@bx		262	1733, 1740, 1746, 1756
1796, 1809		\advance	\bibfont
\ACM@linecount@bxht		870, 1480,	165
1799, 1803, 1804		1481, 1484, 1485,	\bibfont
\acmArticle	11, 946	1509, 1510, 1664,	165
\acmArticleSeq	11, 948	1677, 1705, 1712,	\bibgraphystyle
\acmBadgeL	12, 976	1802, 1905, 1907, 1910	378
\acmBadgeR	12, 971	\affiliation	161
\acmConference	7, 854	9,	\bibsection
\acmConference@date		907, 1638, 1691, 1726	161
857,		\and	\bibstyle
1295, 1766, 1873, 1875		883, 884, 897,	189, 191, 233, 383
		903, 1629, 1634,	\bibstyle@acmauthoryear
		1636, 1643, 1646,	239
		1655, 1685, 1696,	\bibstyle@acmnumeric
		1702, 1720, 1731, 1736	245
		\andify	\bigskip
		1335, 1336, 1619, 1622	1037, 1398, 1504,
		anonsuppress (environ-	1532, 1540, 1702,
		ment)	1736, 1740, 1782,
		\AtBeginDocument	1784, 1786, 1788, 1790
		380	
		\AtEndDocument	
		1035	
		\author	
		9, 868, 1246, 1247	
		\author@bx	
		1651, 1656, 1659	
		\author@bx@sep	
		1653, 1659,	
		1664, 1677, 1705, 1712	

<code>\box</code>	587, 1379, 1382, 1385, 1388, 1390, 1392, 1394, 1396, 1398, 1647, 1659, 1700, 1742	<code>\columnwidth</code>	... 465, 500, 571, 1704, 1733	731, 732, 733, 735, 736, 737, 739, 740, 741, 743, 744, 745, 747, 748, 749, 751, 752, 753, 755, 756, 757, 759, 760, 761, 763, 764, 765, 767, 768, 769, 771, 772, 773, 775, 776, 777, 779, 780, 781, 783, 784, 785, 787, 788, 789, 790, 792, 793, 794, 796, 797, 798, 800, 801, 802, 804, 805, 806, 808, 809, 810, 812, 813, 814, 816, 817, 818, 820, 821, 822, 824, 825, 826, 828, 829, 830, 832, 833, 834, 836, 837, 838, 840, 841, 842, 848, 849, 850, 851, 852, 853, 864, 892, 916, 917, 925, 926, 935, 936, 942, 944, 946, 948, 950, 952, 954, 958, 960, 962, 972, 973, 974, 975, 977, 978, 979, 980, 981, 983, 985, 988, 990, 1009, 1020, 1021, 1044, 1096, 1098, 1126, 1127, 1231, 1233, 1235, 1244, 1256, 1261, 1269, 1348, 1369, 1413, 1435, 1456, 1477, 1505, 1533, 1542, 1550, 1558, 1559, 1560, 1561, 1564, 1567, 1591, 1592, 1596, 1597, 1600, 1601, 1603, 1604, 1606, 1607, 1609, 1610, 1612, 1613, 1615, 1616, 1618, 1620, 1625, 1626, 1627, 1628, 1630, 1637, 1638, 1639, 1655,	
C					
<code>\c@footnote</code>	... 1252	<code>\copyright</code>	... 1545		
<code>\c@secnumdepth</code>	... ... 268, 283, 293	<code>\copyrightpermissionfootnoterule</code>	... 464	
<code>\captionsetup</code>	... ... 530, 532, 534, 536, 545, 547, 550, 553, 560, 563, 566, 1741	<code>\copyrightyear</code>	. 13, 1231	
<code>\ccsdesc</code>	... 12, 1042	<code>\country</code>	... 10, 1548		
<code>\ccsdesc@parse</code>	1043, 1044	<code>\csname</code>	... 233, 281, 284, 291, 294, 323, 489, 503, 1045, 1046, 1047, 1048		
<code>CCSXML (environment)</code>	.. 12	<code>\CurrentOption</code>	... . 87, 88, 89, 90, 91, 92	
D					
<code>\centering</code>	... 504, 564, 567, 1506, 1518, 1656, 1701, 1917	<code>\DeclareNewFootnote</code>	468		
<code>\cite</code>	... 363, 364	<code>\DeclareOptionX</code>	.. 33, 87, 88, 89, 90, 91, 92		
<code>\citeA</code>	... 371	<code>\DeclareRobustCommand</code>	371		
<code>\citealt</code>	... 369	<code>\def</code>	25, 33, 86, 131, 133, 135, 137, 139, 141, 143, 145, 147, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 204, 206, 208, 210, 211, 215, 217, 219, 221, 223, 225, 251, 267, 288, 299, 323, 324, 333, 370, 378, 464, 469, 471, 483, 485, 496, 508, 560, 563, 566, 571, 573, 577, 580, 598, 599, 600, 601, 664, 665, 666, 668, 669, 670, 672, 673, 674, 676, 677, 678, 680, 681, 682, 684, 685, 686, 688, 689, 690, 692, 693, 695, 696, 697, 699, 700, 701, 703, 705, 706, 707, 709, 710, 711, 713, 715, 717, 719, 720, 721, 723, 724, 725, 727, 728, 729,		
<code>\citeANP</code>	... 365				
<code>\citeauthor</code>	... 365				
<code>\citeN</code>	... 363				
<code>\citename</code>	... 376				
<code>\citeNN</code>	... 366				
<code>\citeNP</code>	... 369				
<code>\citep</code>	... 364				
<code>\citestyle</code>	... 19, 231, 250				
<code>\citeyear</code>	... 367, 368, 370				
<code>\citeyearNP</code>	... 367				
<code>\citeyearpar</code>	... 366, 368				
<code>\city</code>	... 10, 1548				
<code>\ClassError</code>	... 30, 846, 996, 1002, 1008				
<code>\ClassInfo</code>	... 94, 150, 844, 993, 995, 999, 1001, 1005, 1007				
<code>\ClassWarning</code>	511, 514, 516				
<code>\cleaders</code>	... 1545				
<code>\clubpenalty</code>	... 312, 318				
<code>\CodelineIndex</code>	... 17				
<code>\Collect@Body</code>	.. 559, 562, 565, 987, 1234				
<code>\color</code>	... 1801				
<code>\color@begingroup</code>	491, 504				
<code>\color@endbox</code>	... 585				
<code>\color@endgroup</code>	... ... 480, 494, 507			

1662, 1680, 1686,	\else 47, 55, 63,	acks 18
1691, 1703, 1715,	74, 81, 100, 125,	anonsuppress 17
1721, 1726, 1737,	213, 234, 261, 270,	CCSXML 12
1738, 1740, 1745,	283, 287, 293, 305,	marginfigure 17
1746, 1756, 1757,	317, 332, 359, 375,	marginfigure 17
1773, 1794, 1806,	379, 474, 523, 535,	printonly 17
1812, 1813, 1888,	869, 877, 881, 882,	screenonly 17
1895, 1900, 1902,	891, 896, 899, 902,	sidebar 17
1976, 1980, 1981,	909, 913, 922, 931,	teaserfigure 14
1982, 1983, 1989,	937, 994, 1000,	\everypar . . . 260, 308, 319
1990, 1992, 1993,	1006, 1013, 1016,	\excludecomment . 1040,
1995, 1996, 1998,	1025, 1028, 1031,	2135, 2137, 2141, 2142
1999, 2001, 2002,	1036, 1049, 1050,	\ExecuteOptionsX . . .
2007, 2012, 2017,	1240, 1257, 1267,	. . . 43, 51, 59, 67, 85
2020, 2021, 2024,	1272, 1275, 1276,	\expandafter
2025, 2027, 2028,	1282, 1287, 1294,	. . . 212, 214, 380,
2029, 2030, 2031,	1299, 1302, 1307,	482, 1045, 1046, 1048
2032, 2041, 2042,	1309, 1318, 1323,	
2043, 2044, 2059,	1327, 1330, 1372,	F
2060, 2061, 2062,	1401, 1406, 1479,	\familydefault 527
2071, 2072, 2073,	1483, 1488, 1496,	\fancyfoot 1844,
2074, 2099, 2100,	1499, 1512, 1520,	1850, 1858, 1866,
2109, 2110, 2130, 2132	1527, 1537, 1543,	1869, 1928, 1929,
\define@boolkey	1557, 1621, 1633,	1931, 1939, 1947, 1953
. 44, 52, 60,	1639, 1642, 1656,	\fancyhead . 1840, 1841,
70, 78, 991, 997, 1003	1674, 1682, 1688,	1842, 1843, 1846,
\define@choicekey . .	1693, 1709, 1717,	1847, 1848, 1849,
. 27, 613, 1058	1723, 1728, 1739,	1853, 1855, 1856,
\definecolor	1747, 1750, 1764,	1861, 1863, 1864,
. . . 386, 387, 388,	1767, 1812, 1868,	1870, 1871, 1872,
389, 390, 391, 392, 393	1951, 2132, 2136, 2143	1874, 1927, 1934,
\department 10, 1548	\email 9, 912, 1637, 1686, 1721	1935, 1936, 1942,
\description 606	\emph 1293, 1295	1943, 1944, 1950, 1952
\descriptionlabel 605, 608	\EnableCrossrefs 19	\fancyheadoffset . . .
\dimexpr . . . 569, 587, 1878	\end 22, 1810, 1919	. . . 1878, 1937, 1945
\divide 1669,	\end@dblfloat 576	\fancyhf 1835, 1922
1671, 1673, 1675, 1710	\end@float 578	\fancypagestyle 1834, 1921
\do 167	\endcsname 232,	\fi 49, 57, 65, 76,
\DocInput 21	233, 281, 284, 291,	83, 102, 124, 127,
\documentclass 9	294, 323, 489, 503,	148, 149, 158, 169,
\dots 1309	1045, 1046, 1047, 1048	171, 173, 175, 177,
E	\enddescription 612	179, 181, 183, 185,
\edef 87, 88, 89, 90	\endgroup . . . 280, 313,	187, 189, 191, 193,
\egroup 481,	331, 1314, 1589, 2128	195, 197, 199, 201,
561, 564, 567,	\endlist 610, 612	203, 205, 207, 209,
578, 584, 1320,	\endminipage 471	211, 216, 218, 220,
1325, 1333, 1658,	\endtrivlist 2121	222, 224, 226, 227,
1736, 1741, 1755, 1772	\enspace 2028	236, 238, 252, 258,
	environments:	263, 273, 285, 295,
	abstract 14	297, 320, 321, 334,

352, 361, 377, 381,	<code>\footnoterule</code>	469	<code>\hfill</code>	1533
384, 449, 463, 478,	<code>\footnotesep</code> . . .	493, 506	<code>\href</code>	1402, 1407,
495, 525, 528, 555,	<code>\footnotesize</code> . .	499,		1489, 1501, 1513, 1528
556, 575, 579, 604,		1844, 1850, 1858,	<code>\hrule</code>	465, 470, 1535
843, 861, 872, 880,		1866, 1869, 1929,	<code>\hrulefill</code> .	1380, 1383,
885, 886, 890, 898,		1931, 1939, 1947, 1953		1386, 1776, 1778, 1780
904, 905, 906, 911,	<code>\footnotetext</code>		<code>\hspace</code>	500,
915, 924, 934, 941,		921, 923, 930, 933, 940		1255, 1477, 1478,
957, 996, 1002,	<code>\footnotetextcopyrightpermission</code>			1505, 1507, 1533,
1008, 1018, 1019,		. . . . . 1268, 1271		1568, 1655, 1698, 1733
1027, 1033, 1034,	<code>\footrulewidth</code>	1837, 1924	<code>\hskip</code>	278,
1038, 1047, 1051,	<code>\format</code>	<u>27</u>		289, 316, 329, 333,
1069, 1072, 1075,	<code>\fulltextwidth</code>			1404, 1491, 1500,
1080, 1083, 1086,		. . . . . <u>568</u> , 571, 587		1516, 1525, 1545, 2118
1089, 1092, 1095,			<code>\hspace</code> . . .	605, 1138,
1125, 1230, 1242,	G			1149, 1158, 1175,
1247, 1248, 1257,	<code>\g@addto@macro</code>			1189, 1201, 1659, 1701
1259, 1270, 1273,		. . . . . 883, 884,	<code>\Huge</code>	1444, 1446,
1274, 1278, 1279,		897, 903, 910, 914,		1448, 1450, 1452, 1454
1284, 1296, 1301,		918, 920, 923, 927,	<code>\hypersetup</code>	354, 360, 1342
1309, 1311, 1312,		929, 932, 938, 939,		
1313, 1321, 1322,		1026, 1032, 1047,	I	
1326, 1332, 1334,		1048, 1235, 1239,	<code>\if</code>	213, 1323
1341, 1368, 1374,		1241, 1634, 1643,	<code>\if@ACM@anonymous</code>	<u>78</u> ,
1405, 1409, 1410,		1683, 1689, 1694,		874, 882, 887, 909,
1411, 1433, 1455,		1718, 1724, 1729, 1737		913, 919, 928, 937,
1476, 1482, 1486,	<code>\gdef</code>	855, 856, 857, 858,		1238, 1245, 1812, 2140
1492, 1498, 1503,		860, 875, 876, 878,	<code>\if@ACM@authorversion</code>	
1515, 1517, 1522,		879, 889, 895, 901,		. . . . . <u>60</u> , 1272, 1288
1530, 1531, 1539,		988, 1024, 1030,	<code>\if@ACM@badge</code>	
1546, 1566, 1588,		1046, 1371, 1632,		<u>964</u> , 1399, 1508, 1524
1617, 1624, 1635,		1636, 1641, 1660,	<code>\if@ACM@journal</code>	
1644, 1645, 1656,		1661, 1678, 1679,		. . . <u>96</u> , 531, 1014,
1676, 1684, 1690,		1681, 1685, 1687,		1276, 1292, 1303,
1695, 1711, 1719,		1692, 1713, 1714,		1328, 1548, 1748, 1760
1725, 1730, 1744,		1716, 1720, 1722, 1727	<code>\if@ACM@manuscript</code>	<u>95</u> ,
1752, 1755, 1768,	<code>\geometry</code>			155, 1011, 1275, 1285
1770, 1792, 1805,		397, 399, 405, 411,	<code>\if@ACM@natbib</code>	<u>70</u> , 159, 362
1811, 1812, 1833,		417, 423, 429, 435, 441	<code>\if@ACM@natbib@override</code>	
1840, 1841, 1846,	<code>\global</code> .	307, 310, 497,		. . . . . <u>68</u> , 125
1847, 1854, 1857,		586, 870, 871, 908,	<code>\if@ACM@newfonts</code>	<u>509</u> , 519
1862, 1865, 1869,		1337, 1338, 1629,	<code>\if@ACM@printacmref</code>	
1876, 1879, 1901,		1646, 1647, 1656,		. . . . . <u>997</u> , 1339
1928, 1953, 1954,		1696, 1699, 1731, 1742	<code>\if@ACM@printccs</code> . . .	<u>991</u>
2026, 2047, 2077,	<code>\grantnum</code>	<u>18</u> , <u>2131</u>	<code>\if@ACM@printcss</code>	992, 1317
2113, 2132, 2139, 2145	<code>\grantsponsor</code> . .	<u>18</u> , <u>2130</u>	<code>\if@ACM@printfolios</code>	
				. . . . . <u>1003</u> , 1840,
<code>\firstpagestyle</code>		<u>1921</u>		1841, 1846, 1847,
<code>\floatname</code>		558		1854, 1857, 1862,
<code>\footnotemark</code>				1865, 1869, 1928, 1953
		918, 927, 1737, 1757		

[illegible]

<code>\mktitle@bx</code>	1243,	<code>\newlength</code>	460, 461, 462, 540,
	1379, 1382, 1385,	..	966, 968, 969, 1799
	1388, 1390, 1392,	<code>\newsavebox</code>	1797
	1394, 1396, 1398,	<code>\newskip</code>	1653
	1487, 1506, 1534,	<code>\newtheorem</code>	
	1647, 1699, 1700, 1742		2090, 2091, 2092,
<code>\moveleft</code>	586		2093, 2094, 2096, 2097
<code>\multiply</code>	1909	<code>\newtheoremstyle</code> . . .	
			2048, 2078
	N	<code>\nobreak</code>	302, 1758
<code>\NAT@@setcites</code>	229	<code>\noindent</code>	
<code>\NAT@aysep</code>	220		483, 1037, 1266,
<code>\NAT@citetp</code>	373		1351, 1353, 1355,
<code>\NAT@close</code>			1357, 1376, 1380,
	169, 171, 173, 175, 218		1383, 1386, 1400,
<code>\NAT@cmprs</code>	197, 199, 201		1487, 1494, 1497,
<code>\NAT@cmt</code>	224		1521, 1535, 1536,
<code>\NAT@ctype</code>	373		1538, 1619, 1647,
<code>\NAT@find@eq</code>	212		1648, 1699, 1735,
<code>\NAT@fullfalse</code>	373		1742, 1743, 1749,
<code>\NAT@longnamestrue</code>	209		1758, 1759, 1771,
<code>\NAT@merge</code>	203, 205, 207		1776, 1778, 1780, 2110
<code>\NAT@nmfmt</code>	211	<code>\nolinkurl</code>	
<code>\NAT@numbersfalse</code>	183		1306, 1310, 1687,
<code>\NAT@numberstrue</code>	185, 187		1689, 1722, 1724, 1771
<code>\NAT@open</code>	169,	<code>\normalcolor</code>	476
	171, 173, 175, 216, 373	<code>\normalfont</code>	508, 1037,
<code>\NAT@partrue</code>	373		1261, 1592, 1597,
<code>\NAT@rem@eq</code>	214		1606, 1607, 1609,
<code>\NAT@sep</code>	177, 179, 181, 226		1610, 2044, 2059,
<code>\NAT@sort</code>	193, 195, 201		2071, 2074, 2116, 2146
<code>\NAT@superfalse</code>	185	<code>\normalsize</code>	1592,
<code>\NAT@supertrue</code>	187		1606, 1607, 1610, 2146
<code>\NAT@swafalse</code>	372	<code>\num@authorgroups</code> . .	
<code>\NAT@up</code>	211		866, 870, 1247,
<code>\NAT@yrsep</code>	222		1665, 1669, 1671, 1706
<code>\NeedsTeXFormat</code>	1	<code>\numberline</code>	284, 294
<code>\newblock</code>	374		
<code>\newbox</code>	1243, 1541, 1651		O
<code>\newcommand</code>	239,	<code>\onehalfspacing</code>	157
	245, 854, 907, 971,	<code>\or</code>	107,
	976, 1021, 1042, 2131		109, 111, 113, 115,
<code>\newcount</code>	866		117, 119, 121, 132,
<code>\newdimen</code>	568,		134, 136, 138, 140,
	1652, 1882, 1884, 1886		142, 144, 146, 342,
<code>\newenvironment</code>			343, 344, 345, 346,
	562, 565, 1234		347, 349, 350, 398,
<code>\newfloat</code>	557		404, 410, 416, 422,
<code>\newif</code>	68, 95, 96, 97, 509,		428, 434, 440, 454,
	964, 1052, 1054, 1056		455, 456, 458, 459,
			460, 461, 462, 540,
			541, 542, 543, 544,
			546, 549, 552, 592,
			593, 594, 595, 596,
			597, 602, 603, 667,
			671, 675, 679, 683,
			687, 691, 694, 698,
			702, 704, 708, 712,
			714, 716, 718, 722,
			726, 730, 734, 738,
			742, 746, 750, 754,
			758, 762, 766, 770,
			774, 778, 782, 786,
			791, 795, 799, 803,
			807, 811, 815, 819,
			823, 827, 831, 835,
			839, 954, 955, 956,
			1100, 1102, 1105,
			1107, 1108, 1110,
			1112, 1114, 1117,
			1120, 1122, 1129,
			1140, 1151, 1159,
			1165, 1177, 1191,
			1203, 1210, 1217,
			1223, 1352, 1354,
			1356, 1358, 1360,
			1362, 1364, 1366,
			1381, 1384, 1387,
			1389, 1391, 1393,
			1395, 1397, 1417,
			1419, 1421, 1423,
			1425, 1427, 1429,
			1431, 1439, 1441,
			1443, 1445, 1447,
			1449, 1451, 1453,
			1460, 1462, 1464,
			1466, 1468, 1470,
			1472, 1474, 1572,
			1574, 1576, 1578,
			1580, 1582, 1584,
			1586, 1595, 1598,
			1599, 1602, 1605,
			1608, 1611, 1614,
			1667, 1668, 1670,
			1672, 1708, 1777,
			1779, 1781, 1783,
			1785, 1787, 1789,
			1791, 1817, 1819,
			1821, 1823, 1825,
			1827, 1829, 1831,

1845, 1852, 1860,	1770, 1772, 1773,	300, 315, 325, 333,
1891, 1896, 1930,	1776, 1778, 1780,	341, 396, 453, 539,
1938, 1946, 1987,	1782, 1784, 1786,	591, 663, 867, 870,
1988, 1991, 1994,	1788, 1790, 1794, 2114	1045, 1065, 1070,
1997, 2000, 2018,	\paragraph 1363, 1968, 2008	1073, 1076, 1081,
2022, 2035, 2036,	\parbox ... 1493, 1511,	1084, 1087, 1090,
2037, 2038, 2039,	1518, 1526, 1798, 1916	1093, 1099, 1128,
2040, 2045, 2046,	\parindent	1265, 1350, 1378,
2065, 2066, 2067,	. 450, 1269, 1271,	1415, 1437, 1458,
2068, 2069, 2070,	1968, 1979, 2030, 2060	1570, 1594, 1654,
2075, 2076, 2103,	\parskip	1663, 1664, 1666,
2104, 2105, 2106,	\part	1669, 1671, 1673,
2107, 2108, 2111, 2112	\PassOptionsToClass	1675, 1677, 1701,
\orcid	9, 916	1704, 1705, 1707,
\outer@nobreak	583	\phantomsection
		.... 163, 1753, 2126
P	\popQED	2121
\p@	450,	\position
457, 464, 465, 469,	470, 607, 1957,	10, 1548
1961, 1965, 1966,	1969, 1970, 1973,	\postcode
1974, 2004, 2009,	2010, 2014, 2015, 2116	10, 1548
\PackageError	49, 57, 65, 76, 83	printonly (environment) 17
\PackageInfo	46, 48, 54, 56,	\ProcessOptionsX
62, 64, 73, 75, 80, 82	\PageIndex	93
\PageStyle	1881	\proof
\par	253, 302, 472,	\proofname
581, 1037, 1269,	1273, 1277, 1320,	284, 294
1325, 1333, 1351,	1353, 1355, 1357,	\protected@edef
1379, 1380, 1382,	1383, 1385, 1386,	.... 272, 488, 502
1398, 1497, 1504,	1521, 1532, 1535,	\providecommand .
1538, 1540, 1558,	1559, 1560, 1561,	374, 376
1619, 1623, 1647,	1649, 1655, 1657,	\ProvidesClass
1681, 1683, 1689,	1694, 1700, 1702,	5
1716, 1718, 1724,	1729, 1734, 1736,	\ProvidesFile
1740, 1741, 1742,	1743, 1754, 1758,	3
		\pushQED
		2115
		\put
		1809
	Q	
	\qed	2115
	\quad	323,
	1854, 1857, 1862, 1865	
	R	
	\raggedright	
	.... 1493, 1534, 1734	
	\raisebox ..	1489, 1501,
	1513, 1528, 1912, 1914	
	\received	14, 1021
	\RecordChanges	18
	\ref	1763, 1769
	\refname	162, 163
	\refstepcounter	271
	\relax	98, 105,
	130, 212, 213, 254,	
	272, 274, 278, 289,	
		300, 315, 325, 333,
		341, 396, 453, 539,
		591, 663, 867, 870,
		1045, 1065, 1070,
		1073, 1076, 1081,
		1084, 1087, 1090,
		1093, 1099, 1128,
		1265, 1350, 1378,
		1415, 1437, 1458,
		1570, 1594, 1654,
		1663, 1664, 1666,
		1669, 1671, 1673,
		1675, 1677, 1701,
		1704, 1705, 1707,
		1710, 1712, 1775,
		1800, 1815, 1839,
		1890, 1892, 1893,
		1894, 1897, 1898,
		1899, 1902, 1904,
		1907, 1908, 1909,
		1910, 1926, 1986,
		2034, 2064, 2102, 2116
	\renewcommand ..	161,
	165, 166, 169, 171,	
	173, 175, 177, 179,	
	181, 231, 527, 605,	
	868, 912, 1236,	
	1252, 1836, 1837,	
	1923, 1924, 1956,	
	1960, 1964, 1968,	
	1972, 2003, 2008, 2013	
	\renewenvironment ..	
	.. 559, 606, 987, 2114	
	\repeat	1804, 1906
	\RequirePackage ..	26,
	152, 153, 154, 156,	
	160, 338, 385, 394,	
	466, 520, 521, 522,	
	524, 529, 1039, 1795	
	\reset@font	486, 499
	\reversemarginpar ..	448
	\rightskip	1977
	\rlap	1913
	\rule	493, 506, 1915
	S	
	\savebox	1798
	screenonly (environ-	
	ment)	17
	\scriptsize	1801

[illegible]