Making ACM LaTeX styles

Boris Veytsman, George Mason University, USA

TUG'2016

ACM

Association for
Computing Machinery

Advancing Computing as a Science & Profession

The biggest publisher in computing: 50+ journals, hundreds of conferences. . .

Early adopters of TEX.

The problem of early adopters

The code tends to be rather old. . .

```
\typeout{Document Class 'sig-alternate' <9th June '13>.
  Modified by [redacted]/[redacted]/Boris Veytsman}
\typeout{Based in part upon document Style `acmconf' <22 May 89>.
   Hacked 4/91 by}
\typeout{[redacted]@cs.cmu.edu, 4/93 by [redacted]@cs.mcgill.ca}
\typeout{Excerpts were taken from (Journal Style) 'esub2acm.cls'.}
```

The code tends to contain too much copy and paste. . .

1. acm_proc_article-sp.cls
2. acmlarge.cls
3. acmsiggraph.cls
4. acmsmall-ec13.cls
5. acmsmall.cls
6. acmtog.cls
7. acmtrans2m.cls
8. sig-alternate-05-2015.cls
9. sig-alternate.cls
10. sigchi-ext.cls
11. sigchi.cls
12. sigplanconf.cls

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1. acm_proc_article-sp.cls
2. acmlarge.cls
3. acmsiggraph.cls
4. acmsmall-ec13.cls
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8. sig-alternate-05-2015.cls
9. sig-alternate.cls
10. sigchi-ext.cls
11. sigchi.cls
12. sigplanconf.cls

BibTeX files:

1. ACM-Reference-Format-Journals.bst
2. SIGCHI-Reference-Format.bst
3. acmsiggraph.bst
4. acm-abbrev.bst
5. acm-alpha.bst
6. acm-plain.bst
7. acm-unsrt.bst

The code is *almost* identical. . .

The code tends to rot. . .

From the letter by a TEXexpert[1]

> . . . 3 packages copied in with a comment (good!) that they are needed but without taking out `\endinput` that was in the code from the package copied in (bad :-) so after the first nothing else is ever used

[1] Name withheld by request

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>
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>
> and the footnotes are horror and the fonts too and. . .
>
> . . . looks worse than your average Word document

[1] Name withheld by request

Example

```
\DeclareOption{acmtopc}{
  \typeout{}
  \typeout{Using ACM, TOPC's option: 2013/01/18 by [redacted]}
  \typeout{}
  \global\@acmtopctrue
  \global\@acmjacmfalse
  \global\@acmtissecfalse
  \global\@acmtoclfalse
  \global\@acmtocsfalse
  \global\@acmtochifalse
  \global\@acmtodaesfalse
  34 lines deleted
  \def\@journalName{ACM Transactions on Parallel Computing}
  \def\@journalNameShort{ACM Trans. Parallel Comput.}
  \def\@journalCode{topc}
  \def\@permissionCodeOne{1539-9087}
}
```

```
\DeclareOption{acmjacm}{
  \typeout{}
  \typeout{Using ACM, JACM's option: 2010/05/04 by [redacted]}
  \typeout{}
  \global\@acmjacmtrue
  \global\@acmtissecfalse
  \global\@acmtoclfalse
  \global\@acmtocsfalse
  \global\@acmtochifalse
  \global\@acmtodaesfalse
  34 lines deleted
  \def\@journalName{Journal of the ACM}
  \def\@journalNameShort{J. ACM}
  \def\@journalCode{jacm}
  \def\@permissionCodeOne{0004-5411}
}
```

My role

I consulted ACM since 2011:

1. BibTeX updates
2. “Concepts system” (enhanced keywords)
3. New boilerplate copyright

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1. BibTeX updates
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Problems:

1. How do you support and add new features to a dozen of *slightly* different styles?
2. If my name appears in the code (many times!), should I be responsible for the mess?

Solution

Full refactoring.

Fortunately, ACM wanted new design of all templates: new fonts, new sizes etc.

Solution

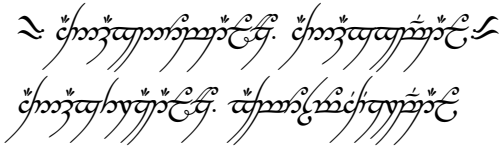
Full refactoring.

Fortunately, ACM wanted new design of all templates: new fonts, new sizes etc.

1. ACM senior editorial staff: typographic design
2. Aptara: typesetting process
3. Yours truly: LaTeX code.

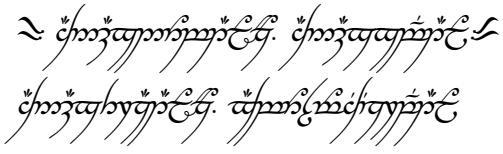
Principles for new TEX code

No more forking! One code for all



Principles for new TEX code

No more forking! One code for all



This means one `dtx` source. I decided to have one `cls` file as well—just to avoid temptation to rename and change a class file.

Same interface for all outputs

You should be able to change

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

to

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

and everything “just works”. . .

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Important consequence: one Bib style.

As much standard LaTeX and AMSLaTeX as possible

Exception: authors' information.

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Exception: authors' information.

Structured commands

TeX file is to be analyzed to extract information for metadata.

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```
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}.
```

Some features of the new class

Variations as options

```
\documentclass[acmsmall]{acmart}
\documentclass[sigchi]{acmart}
\documentclass[manuscript]{acmart}
```

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```
\documentclass[acmsmall]{acmart}
\documentclass[sigchi]{acmart}
\documentclass[manuscript]{acmart}
```

Some additional options

review: lines are numbered

anonymous: authors' names, addresses and acknowledgements are suppressed.

screen: online version

Authors and addresses

```
\author{Ben Trovato}
\authornote{Dr.~Trovato insisted his name be first.}
\orcid{1234-5678-9012}
\email{trovato@corporation.com}
\author{A. U. Thor}
\email{author@corporation.com}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \streetaddress{P.O. Box 1212}
  \city{Dublin}
  \state{Ohio}
  \postcode{43017-6221}}
```

Some other bells and whistles

Copyright system

```
\setcopyright{acmcopyright}
%\setcopyright{acmlicensed}
%\setcopyright{rightsretained}
%\setcopyright{usgov}
%\setcopyright{usgovmixed}
%\setcopyright{cagov}
%\setcopyright{cagovmixed}
```

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```
\setcopyright{acmcopyright}
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%\setcopyright{cagov}
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```

CCS system

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

Conditional typesetting

```
\begin{printonly}
  See the supplementary materials in the online version
\end{printonly}

\begin{screenonly}
\begin{table}
...
\end{table}
\end{screenonly}
```

Conditional typesetting

```
\begin{printonly}
  See the supplementary materials in the online version
\end{printonly}

\begin{screenonly}
\begin{table}
...
\end{table}
\end{screenonly}
```

Additional floats

teaserfigure: a special non-float in the frontmatter

marginfigure, margintable, sidebar: marginalia (mostly for SIGCHI extended abstracts)

Organization

Code repository at https://github.com/borisveytsman/acmart/.

Github gives a number of nice features:

1. Bug tracking
2. Mechanism for contributions
3. Nice version control

Samples

acmsmall

A Multifrequency MAC Specially Designed for Wireless Sensor Network Applications

GANG ZHOU, College of William and Mary
YAFENG WU, University of Virginia
TING YAN, Eaton Innovation Center
TIAN HE, University of Minnesota
CHENGDU HUANG, JOHN A. STANKOVIC, and TAREK F. ABDELZAHER, University of Virginia

Multifrequency media access control has been well understood in general wireless ad hoc networks, while in wireless sensor networks, researchers still focus on single frequency solutions. In wireless sensor networks, each device is typically equipped with a single radio transceiver and applications adopt much smaller packet sizes compared to those in general wireless ad hoc networks. Hence, the multifrequency MAC protocols proposed for general wireless ad hoc networks are not suitable for wireless sensor network applications, which we further demonstrate through our simulation experiments. In this article, we propose MMSN, which takes advantage of multifrequency availability while, at the same time, takes into consideration the restrictions of wireless sensor networks. Through extensive experiments, MMSN exhibits the prominent ability to utilize parallel transmissions among neighboring nodes.

CCS Concepts: •**Computer systems organization** → **Embedded systems;** *Redundancy;* Robotics; •**Networks** → Network reliability;

Additional Key Words and Phrases: Wireless sensor networks, media access control, multi-channel, radio interference, time synchronization

ACM Reference format:
Gang Zhou, Yafeng Wu, Ting Yan, Tian He, Chengdu Huang, John A. Stankovic, and Tarek F. Abdelzaher. 2010. A Multifrequency MAC Specially Designed for Wireless Sensor Network Applications. *ACM Trans. Web* 9, 4, Article 39 (March 2010), 0 pages.
DOI: 0000001.0000001

1 INTRODUCTION

As a new technology, Wireless Sensor Networks (WSNs) has a wide range of applications [5, 8, 13], including environment monitoring, smart buildings, medical care, industrial and military applications. Among them, a recent trend is to develop commercial sensor networks that require

This work is supported by the National Science Foundation, under grant CNS-0435060, grant CCR-0325197 and grant EN-CS-0329609.
Author's addresses: G. Zhou, Computer Science Department, College of William and Mary; Y. Wu and J. A. Stankovic, Computer Science Department, University of Virginia; T. Yan, Eaton Innovation Center; T. He, Computer Science Department, University of Minnesota; C. Huang, Google; T. F. Abdelzaher, (Current address) NASA Ames Research Center, Moffett Field, California 94035.
 1559-1131/2010/3-ART39 $15.00
DOI: 0000001.0000001

39

acmlarge

39

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CCS Concepts: •**Computer systems organization** → **Embedded systems;** *Redundancy;* Robotics; •**Networks** → Network reliability;

General Terms: Design, Algorithms, Performance

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DOI: 0000001.0000001

acmtog

manuscript

A Multifrequency MAC Specially Designed for Wireless Sensor Network Applications

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1 INTRODUCTION

As a new technology, Wireless Sensor Networks (WSNs) has a wide range of applications [5, 8, 15], including environment monitoring, smart buildings, medical care, industrial and military applications. Among them, a recent trend is to develop commercial sensor networks that require pervasive sensing of both environment and human beings, for example, assisted living [4, 12, 20] and smart homes [3, 12, 20].

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"For these applications, sensor devices are incorporated into human clothe [3, 8, 27, 39] for monitoring health related information like EKG readings, fall detection, and voice recognition".

While collecting all these multimedia information [4] requires a high network throughput, off-the-shelf sensor devices only provide very limited bandwidth in a single channel: 19.2Kbps in MICA2 [8] and 250 Kbps in MICAz.

In this article, we propose MMSN, abbreviation for Multifrequency Media access control for wireless Sensor Networks. The main contributions of this work can be summarized as follows.

- To the best of our knowledge, the MMSN protocol is the first multifrequency MAC protocol especially designed for WSNs, in which each device is equipped with a single radio transceiver and the MAC layer packet size is very small.
- Instead of using pairwise RTS/CTS frequency negotiation [5, 13, 38, 39], we propose lightweight frequency assignments, which are good choices for many deployed comparatively static WSNs.
- We develop new toggle transmission and snooping techniques to enable a single radio transceiver in a sensor device to achieve scalable performance, avoiding the noticeable "one control channel + multiple data channels" design [27].

2 MMSN PROTOCOL

2.1 Frequency Assignment

We propose a suboptimal distribution to be used by each node, which is easy to compute and does not depend on the number of competing nodes. A natural candidate is an increasing geometric sequence, in which

$$P(t) = \frac{b^t \sqrt{b}}{b-1} \tag{1}$$

where $t = 0, \ldots, \mathcal{T}$, and b is a number greater than 1.

In our algorithm, we use the suboptimal approach for simplicity and generality. We need to make the distribution of the selected back-off time slice at each node conform to what is shown in Equation (1). It is implemented as follows: First, a random variable a with a uniform distribution within the interval (0, 1) is generated on each node, then time slice i is selected according to the following equation:

$$i = \lfloor (\mathcal{T}+1) \log_b [a(b-1)+1] \rfloor.$$

It can be easily proven that the distribution of i conforms to Equation (1).

A Multifrequency MAC Specially Designed for Wireless Sensor Network Applications*

This is a subtitle†

GANG ZHOU‡, YAFENG WU, and JOHN A. STANKOVIC, University of Virginia
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CHENGDU HUANG, Google and University of Virginia
TAREK F. ABDELZAHER, University of Illinois at Urbana-Champaign, University of Virginia, and Google

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*This is a fifteenth
†Subtitle note
‡Corresponding author
§This is an abstract footnote

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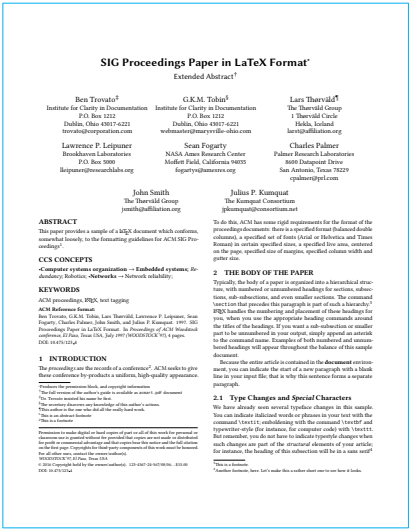
sigconf



SIG Proceedings Paper in LaTeX Format*

Extended Abstract†

Ben Trovato‡
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P.O. Box 1212
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jpkumquat@consortium.net

ABSTRACT

This paper provides a sample of a LaTeX document which conforms, somewhat loosely, to the formatting guidelines for ACM SIG Proceedings*.

CCS CONCEPTS

•**Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; •**Networks** → Network reliability;

KEYWORDS

ACM proceedings, LaTeX, text tagging

ACM Reference format:

Ben Trovato, G.K.M. Tobin, Lars Thørväld, Lawrence P. Leipuner, Sean Fogarty, Charles Palmer, John Smith, and Julius P. Kumquat. 1995. SIG Proceedings Paper in LaTeX Format. In *Proceedings of ACM Woodstock conference, El Paso, Texas USA, July 1997 (WOODSTOCK'97),* 4 pages.

DOI: 10.475/123_4

1 INTRODUCTION

The *proceedings* are the records of a conference[1]. ACM seeks to give these conference by-products a uniform, high-quality appearance. To do this, ACM has some rigid requirements for the format of the proceedings documents: there is a specified format (balanced double columns), a specified set of fonts (Arial or Helvetica and Times Roman) in certain specified sizes, a specified live area, centered on the page, specified size of margins, specified column width and gutter size.

Because the entire article is contained in the **document** environment, you can indicate the start of a new paragraph with a blank line in your input file; that is why this sentence forms a separate paragraph.

2.1 Type Changes and *Special* Characters

We have already seen several typeface changes in this sample. You can indicate italicized words or phrases in your text with the command `\textit`; emboldening with the command `\textbf` and typewriter-style (for instance, for computer code) with `\texttt`. But remember, you do not have to indicate typestyle changes when such changes are part of the *structural* elements of your article; for instance, the heading of this subsection will be in a sans serif[4] typeface, but that is handled by the document class file. Take care with the use of[5] the curly braces in typeface changes; they mark the beginning and end of the text that is to be in the different typeface.

You can use whatever symbols, accented characters, or non-English characters you need anywhere in your document; you can find a complete list of what is available in the *LaTeX User's Guide* [7].

*Produces the permission block, and copyright information

†The full version of the author's guide is available as `acmart.pdf` document

‡Dr. Trovato insisted his name be first.

§The secretary disavows any knowledge of this author's actions.

¶This author is the one who did all the really hard work.

*This is an abstract footnote

DOI: 10.475/123_4

†This is a footnote.

‡Another footnote, here. Let's make this a rather short one to see how it looks.

sigplan

SIG Proceedings Paper in LaTeX Format*

Extended Abstract†

Anonymous Author(s)

Figure 1. This is a teaser

Abstract

This paper provides a sample of a LaTeX document which conforms, somewhat loosely, to the formatting guidelines for ACM SIG Proceedings.

CCS Concepts •**Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; •**Networks** → Network reliability;

Keywords ACM proceedings, LaTeX, text tagging

ACM Reference format:

Anonymous Author(s). 1997. SIG Proceedings Paper in LaTeX Format. In *Proceedings of ACM Woodstock conference, El Paso, Texas USA, July 1997 (WOODSTOCK'97),* 4 pages.

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[1] Title note

[2] Subtitle note

[3] This is a footnote

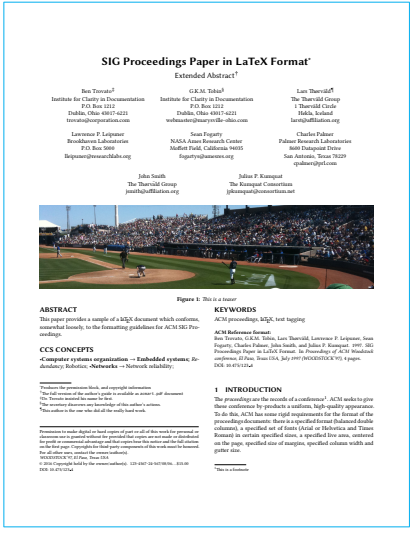
DOI: 10.475/123_4

[4] This is a footnote.

[5] Another footnote, here. Let's make this a rather short one to see how it looks.

[6] A third, and last, footnote.

siggraph



SIG Proceedings Paper in LaTeX Format*

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Lars Thørväld¶ The Thørväld Group 1 Thørväld Circle Hekla, Iceland larst@affiliation.org

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Figure 1: *This is a teaser*

ABSTRACT

This paper provides a sample of a LaTeX document which conforms, somewhat loosely, to the formatting guidelines for ACM SIG Proceedings.

CCS CONCEPTS

•**Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; •**Networks** → Network reliability;

KEYWORDS

ACM proceedings, LaTeX, text tagging

ACM Reference format:
Ben Trovato, G.K.M. Tobin, Lars Thørväld, Lawrence P. Leipuner, Sean Fogarty, Charles Palmer, John Smith, and Julius P. Kumquat. 1997. SIG Proceedings Paper in LaTeX Format. In *Proceedings of ACM Woodstock conference, El Paso, Texas USA, July 1997 (WOODSTOCK'97),* 6 pages.
DOI: 10.475/123_4

1 INTRODUCTION

The *proceedings* are the records of a conference[1]. ACM seeks to give these conference by-products a uniform, high-quality appearance. To do this, ACM has some rigid requirements for the format of the proceedings documents: there is a specified format (balanced double columns), a specified set of fonts (Arial or Helvetica and Times Roman) in certain specified sizes, a specified live area, centered on the page, specified size of margins, specified column width and gutter size.

[1]This is a footnote

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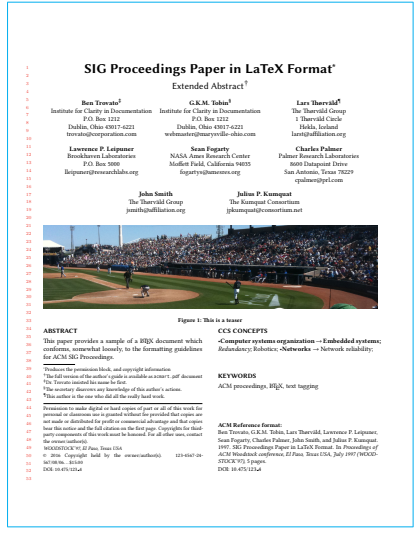

SIG Proceedings Paper in LaTeX Format*

Extended Abstract†

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ABSTRACT

UPDATED—July 12, 2016. This sample paper describes the formatting requirements for SIGCHI Extended Abstract Format, and this sample file offers recommendations on writing for the worldwide SIGCHI readership. Please review this document even if you have submitted to SIGCHI conferences before, as some format details have changed relative to previous years. Abstracts should be about 150 words. Required.

WOODSTOCK'97, El Paso, Texas USA

Plans

1. Accessibility support
2. Biblatex option

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