TUG 2021 abstracts

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Editor's note: Links to videos and other information posted at: `tug.org/tug2021`.

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XLingPaper's use of TEX technologies
Andy Black, Hugh Paterson

XLingPaper is a plugin to XMLMind, an XML editor designed for publishers. We describe XLingPaper's development history and its dependencies on TEX packages for PDF creation.

XLingPaper does three things. 1) It controls the user interface of a powerful tool, only allowing valid document sections to be inserted into a document, thus reducing user friction in the document production process. 2) It provides a constrained number of document sections which are relevant in the production of linguistically-oriented publications, e.g., grammars, dissertations, theses, journal articles, edited volumes, etc. 3) It exports documents to a variety of formats, e.g., PDFs, ePUB, OpenOffice Writer, HTML.

Introduction to LATEX — in Spanish
Alexánder Borbón Alpízar

This presentation, in Spanish, provided a basic introduction to LATEX, mentioning its principal distributions and the most-commonly used editors. In addition, the basic structure of a simple document was shown, along with how to write mathematical equations, tables and figures.

To review these topics it is suggested to check the author's book *Edición de textos científicos con LATEX. Composición, gráficos, diseño editorial y presentaciones beamer*, available at:

`tecdigital.tec.ac.cr/revistamatematica/`
`Libros/LaTeX/MoraW_BorbonA_LibroLaTeX.pdf`

2020: A year in review, living on an island
Paulo Cereda

In this talk, Paulo recalls 2020 on the Island of TEX: an eventful year with a new backend for the online TEX and LATEX documentation lookup system, the release of a tool for finding fonts that contain a given Unicode glyph, a major update for `arara` and other actions and initiatives as a means to enrich the TEX ecosystem. Yet, a new adventure is about to unfold, for the Island has bold and exciting plans for the future.

Variable fonts
David Crossland

Making the web more beautiful, fast, and open through great typography.

R and LATEX: Typesetting graphs in a reproducible way
Vic van Dijk

Knitr ties LATEX and R together in a very powerful combination. TikZ typesets visually appealing graphs from R code. Data is processed upon typesetting a report. All calculations can be made available to the reader as R code. This simplifies reproducible research. R offers a whole ecosystem of statistic procedures, graph packages, and even connections to other systems such as Python and MATLAB.

In this talk I will show the applications of R and LATEX that I came across. My aim is to typeset beautiful graphs in a widely accessible manner. One example is available at:

`setyourtext.com/en/blog/graphing-nitrogen-`
`dioxide-air-concentration-data`

Towards 21st century digital typography
Jonathan Fine

This abstract is a short essay giving the framework for my talk. I take a long view. In my talk I'll provide some details and examples. My talk is about digital typography in 2050 and 2070, and the conditions for its emergence that are already present.

A few billion years ago life in the oceans began oxygenating the atmosphere. By 350 million years ago life on land was creating what we now call fossil fuel (coal, crude oil and natural gas). A few million years ago the genus homo (man) emerged.

Birds have song and dance. The tool-making Neanderthals (250,000 to 40,000 years ago) probably had language. Human art and music arose at least 40,000 years ago. Around 14,000 years ago agriculture and settlement started to replace nomadic hunt and gather. Writing (on tablets) followed about 5,000 years ago.

Ancient history (3000BC to AD500) includes about 80 civilizations worldwide with written records. This is a very rich period which still influences contemporary thought in art, religion, society, culture and politics.

Along with the rise of the European Renaissance in the 1400s, printing with moveable type emerged, to replace hand copying of books. This is typography, born out of calligraphy (writing with pen or brush).

By the 20th century there were massive printing presses, producing a million copies or more of each issue of a newspaper, which were then distributed on a national basis. (In 1950 the *News of the World* sold over 8 million copies each week.)

Also in the 20th century there was electrification, wireless stations and receivers, and studios. This distributed spoken voice news, and music, to millions.

Cinema and then television provided moving images to accompany the sound.

By 2020 vast torrents of information were being created and transmitted using computers and networks (mobile phones, wi-fi and 4G). Computers are everywhere, even in electric light bulbs. The present context is very different from the 1970s, when Don Knuth started his foundational work on digital typography, and the creation of TeX and Metafont.

Gutenberg and others replaced hand copying of books by the printing press. Knuth and others replaced mechanical typography by computer (or digital) typography. Both produce only static visual images.

If humanity avoids destroying its culture and civilization, then the digital typography of 2050 will be different again. It is already emerging. One major component is the (world wide) web and its servers and browsers. This was pioneered by Tim Berners-Lee. Another is the smart mobile phone (now dominated by Apple and Android). A third is the large high-resolution flat screen television. A fourth is the ubiquity of computers.

I am now in my late 60s. I hope to be alive to see the digital typography of 2050, and if so I expect some surprises. Maxwell's unification of electricity and magnetism (1865) lives on as the theoretical basis for electrification, wireless and much more. I hope the work of Knuth and others in digital typography can similarly be transmitted as useful living tools and skills to those who follow us.

I do not expect to be alive in 2070, yet alone the 100th birthday of TeX (2078 to 2082). I hope my contribution adds to the cause for celebration.

Code and math in the dark
Jonathan Fine

It's said: Easy reading is hard writing. Certainly both reader and writer need to make extra effort, when the reader is visually impaired, and the material is technical. This talk is about improving the accessibility of TeX and its outputs. This is not a typesetting talk. It is a user experience and social interaction talk.

For sighted readers the printed page assists short-term memory, as does typography. They reduce the cognitive load. The eye can pick up subtle hints. Clarity of organisation and writing will reduce the cognitive load for both visually impaired and sighted readers, provided they have sufficient verbal skills.

This year I've had regular online discussions about accessibility with blind and visually impaired persons, and listened in on their forum conversations with each other. I've learnt a lot from this.

The introduction of computers and networks has been, with some exceptions, an enabling technology for the visually impaired. A screen reader allows the user to hear what is written, without needing a sighted assistant. And video calls by mobile phone means that the sighted assistant need not be physically present.

Louis Braille, who became blind as a young child, developed the tactile code for reading and writing that we now know simply as Braille. Screen readers allow the visually impaired to write computer software. The major screen readers are JAWS, Orca and NVDA. It should be no surprise that their leading developers, Glen Gordon, Mark Mulcahy, Michael Curran and James Teh are all blind.

To summarize, my talk will share what I've learned from my interactions with blind and visually impaired users, and how it relates to the accessibility of TeX and its outputs.

LaTeX to HTML conversion with TeX4ht
Michal Hoftich

TeX4ht is a converter from LaTeX to HTML and several other output formats. Recent work focuses on keeping current with package updates, and supporting new packages. In this talk, I will discuss its current status and recent development. I will show how to change the look of the generated document, how to select the right way to produce math (including MathJax and MathML), and how to fix some common issues caused by clashes with unsupported packages or commands.

Cary Graphic Arts Collection Pressroom Tour
Amelia Hugill-Fontanel

A visit and work discussion with a letterpress printer. For much more, see `cary.rit.edu`.

Graphics with **PGFPlots** — in Portuguese
Emílio Kavamura

The workshop, in Portuguese, intends to briefly present the features of PGFPlots for LaTeX users. The topics covered start from the environment description, present the types of graphics and their components, and possible customizations. The presentation ends with the use of the `animate` package to provide animations from a set of inline text graphics. The code for the examples presented is available for you to try and to evaluate the capabilities of the graphic environment in LaTeX.

Bidirectional typesetting in TEX:
Past, present, and future
Vafa Khalighi

This talk is based primarily on my last 15 years of
TEX development in the area of bidirectional typeset-
ting. I will look at the current state of bidirectional
typesetting in TEX, discuss the issues I have faced,
the current challenges, and what needs to be done.

I will also discuss how the `bidi` package is used
for typesetting bidirectional documents and show
a few sample documents (books, theses, and other
types of documents) produced by the `bidi` pack-
age. Some capabilities of the `bidi` package will be
demonstrated live.

Persian typesetting in TEX:
Past, present, and future
Vafa Khalighi

This talk is based primarily on my last 15 years of
TEX development in the area of Persian typesetting.
I will look at the current state of Persian typesetting
in TEX, discuss the issues I have faced, the current
challenges, and what needs to be done.

I will also discuss how the `xepersian` pack-
age is used for typesetting mainly Persian docu-
ments and show a few sample documents (books,
theses, and other types of documents) produced by
the `xepersian` package. Some capabilities of the
`xepersian` package will be demonstrated live.

Tactile mathematics:
Enabling sighted and blind people to share
mathematical experience
*Alexei Kolesnikov, Al Maneki, Michael Cantino,
Rob Beezer, Volker Sorge*

High quality automated transcription of mathemati-
cal texts, including graphics, into tactile form is an
open problem. In this talk, we describe the reasons
for producing tactile forms of mathematical texts.
We will describe common challenges involved in tran-
scription, and progress made to date. We make the
case that semantically rich source files are needed to
produce adequate tactile and audio-tactile forms of
scientific materials.

Reviving Type 3 fonts
for modern LuaLATEX documents
Marcel Krüger

For a long time, Type 3 fonts in LATEX-generated PDF
files were known for (undesirable) bitmap fonts, but
that's only a small aspect of what this font format
can do. With OpenType color fonts, the idea behind
Type 3 fonts has seen a revival, and LuaTEX recently
added support for adding such fonts for non-bitmap
use cases too.

In this talk I want to look at how this format
can be used to create smaller and simpler PDF files
involving color fonts and user-generated glyphs and
consider advantages and disadvantages in contrast
to traditional alternatives like virtual fonts or macro-
based solutions.

Taming the beast — Advances in paragraph
tagging with pdfTEX and XƎTEX
Frank Mittelbach

In this talk I demonstrate and describe our solution
for automatically tagging paragraphs when using
engines such as pdfTEX or XƎTEX. The situation
with LuaTEX is different, and simpler, and therefore
not the subject of this talk. I briefly touch on the
problems one encounters and explain the approaches
we used to overcome them. This will be done with a
number of demonstrations intermixed with theoreti-
cal explanations.

This work is part of our multi-year journey to
gradually modernize LATEX so that it can automat-
ically produce high-quality tagged and "accessible"
PDF without the need to post-process the result of
the LATEX run.

Accessible research reports: Case study,
including acronyms and glossaries
Ross Moore, Tom Price

US government agencies have a need for properly
accessible PDFs. The practice of 'remediation' (ad-
justing and augmenting the PDF after the typesetting
phase) is both expensive and produces generally poor
results.

In this talk we show how a much better product
can be created directly using LATEX, adapted for con-
structing documents that fully conform to PDF/UA-1
and PDF/A-3a. LATEX sources are handled at three
levels: (i) initial data capture by research scientists,
(ii) heavy editorial work to enable accessibility as-
pects, (iii) production-level processing to produce
feature-rich tagging and full accessibility. The two
speakers will discuss different aspects of these three
levels, according to their own involvement in this
generalised workflow.

Of particular interest is the use of acronyms and
glossaries to enrich the PDF with features that asso-
ciate technical terms and abbreviations with a fully
expanded description of the meanings of those terms,
accessible both visually and to assistive technology
for non-visual readers.

Here are some links to websites referred to early
in the talk.

- NOAA Statement on Accessibility:
  `noaa.gov/accessibility`

- PDF 508 Accessibility Checklist:
  `ssa.gov/accessibility/checklists/pdf/pdfchecklist.html`
- Ugly Truth: PDF Accessibility Services Don't Meet 508 Document Compliance Requirements: `krisrivenburgh.medium.com/pdf-accessibility-services-dont-meet-508-document-compliance-requirements-e659dccbdb3b`
- Next-generation PDF: `ngpdf.com`, preferred for validation (using veraPDF) of Tagged PDF documents, and conversion into HTML.

Here's a link to the lecture slides, and to where the main example PDF may appear, once published by NOAA, and thereby released into the public domain.

- Acronyms for NOAA Center Reference Documents (CRDs): `tug.org/tug2021/assets/pdf/Thomas-E-Price-Jr-slides.pdf`
- Examples of Tagged PDF documents built using LaTeX: `web.science.mq.edu.au/~ross/TaggedPDF/`

Publishing for all: Using LaTeX to help improve the accessibility of an open-access journal
Michael Nolan, Todd Pagano, Suhas Chikkanaravangala Vijayakumar, Rahul Jaiswal

A screen reader is a vital tool that helps individuals who are blind or low-vision read digital text. Unfortunately, not all file formats receive the same level of support from screen readers. For example, while PDF files have accessibility features that can be used, they are often not the preferred file format for screen reader users. Between line breaks, multiple columns, symbols, and images, screen readers often struggle with academic journal articles in certain file formats.

We will discuss the collaboration of the Open at RIT project with an open access journal and their combined goal of improving accessibility and readership for all. We will explore the difficulties that journals face on their journey towards accessibility, why this journey is worth making, and show how using LaTeX to publish both to our traditional PDF format as well as a more accessible HTML format allowed us to make a big leap towards becoming a more accessible journal.

Data-driven documents using Jupyter Notebooks and Overleaf
Simon Porter

We will show how Digital Science combines Jupyter Notebooks and Overleaf projects for automated creation of professional-looking documents, and team collaboration. An example:
`gigantum.com/sjcporter/gigaleaf-example`

How a LaTeX-based company lived through a modern day pandemic
Aravind Rajendran, Rishi T, Apu V, Rahul Krishnan S

Now we all know what a pandemic is and how dreadful it is for all mankind. Most generations who are alive today would have not known one, never seen one, never felt one. Surviving these trying times has made us all adapt to change and we are no stranger. As a typesetter for the leading scientific, technical and medical publishers around the world, we have helped typeset thousands of pages of research articles on COVID-19. Somewhere through our business of 'typesetting' — directly or indirectly we feel we have helped. Our main objective during this challenging period, was to keep the business rolling safely, making sure our employees and customers were not let down. Through this journey we have helped our staff work safely ensuring they had no job loss. And for the scientific community we have worked tirelessly, helping publishers continue publishing research articles quickly without losing a single committed due date. This is how we assured business continuity and certainty for our employees, customers and business.

Looking back, with gratitude we can now confidently shout out, yes, we have achieved what we had set out for — making LaTeX work for a business, ensuring no job losses, standardising our workflows, making data-driven analytical decisions within LaTeX workflows and to sum it all, keep delivering aesthetically pleasing documents to our customers and delighting them always. It was indeed not a cake walk, times were superbly challenging and we have persevered. Finding the Goldilocks between aesthetics and efficiency has always been a challenge for large production houses. But in this pandemic time we have achieved just that, the right balance, "Our Goldilocks" for LaTeX-based typesetting. This is our journey, this is our story; the story still continues. . .

How to make a logo/symbol for a font
Matheus Rocha

Learn how to create a new symbol and make an OpenType font for your logo to be used in TeX and elsewhere.

Producing a book for Amazon KDP
Paulo Ney de Souza

Details of producing a book in LaTeX for Amazon Kindle Direct Publishing.

Any colo(u)r you like

Joseph Wright

TeX itself has no built-in support for colour, which is therefore handled by specials or engine-specific extensions. For LaTeX 2ε, the different interfaces are abstracted out by the color package. However, there is a lot that the color package does not do; for example, handling colour model interconversion, mixing colours or device-specific colour spaces. Packages such as `xcolor` and `colorspace` fill that gap, whilst the `luacolor` package addresses a separate issue: avoiding the need to use whatsits for colour at all.

As part of wider efforts to enhance the LaTeX kernel via `expl3` additions, recent work on the `l3color` package has brought many of these concepts into a single set of interfaces. That means not only copying existing ideas but also ensuring maximal functionality. In my talk, I will explore the work on `l3color`, highlighting where it can go beyond the predecessor packages in ease of use and functionality.

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