Editorial comments

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Donald P. Story, 1946–2022

Don Story, an active participant in the LaTeX community, passed away on the last day of 2022, after a long battle with ALS. A member of the Mathematics faculty of the University of Akron from 1976 until his retirement in May 2006, Don's interest in TeX was directed mainly toward helping others communicate mathematics. His presence on CTAN consists of an astounding 62 packages. The most well known of these is `acrotex`, the AcroTeX education bundle. This bundle provides tools based on cooperation between Adobe Acrobat and TeX "for putting mathematics on the internet".[1] Its `README` file shows activity well into 2021, and ends with the note "Now, I simply must get back to my retirement."[2]
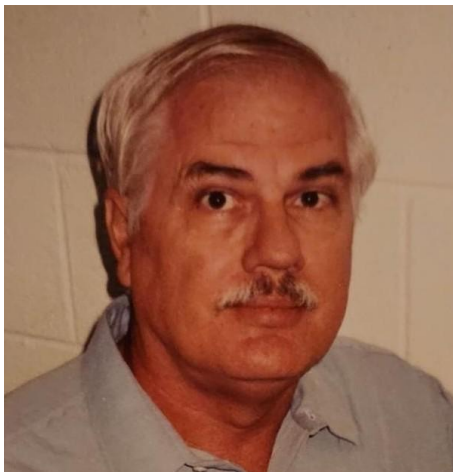
Born 17 December 1946 in El Paso, Texas, Don didn't stay there for long. As an "Air Force brat", he moved around with his family for 19 years, mostly in Europe, but ended up at the University of Florida where he received his Ph.D. in mathematics. In addition to his position at the University of Akron, for a time he worked for Adobe, hence his solid knowledge of Acrobat. After retirement, he moved to Florida, where he continued to mentor students and develop his packages at Northwest Florida State College.

Don's death was reported to us by his friend and colleague Tom Price, Professor Emeritus, Mathematics, at the University of Akron. Tom also reported that, in their younger years, he and Don were avid table tennis opponents and their friendship persisted even though Don invariably won.

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[1] AcroTeX: Acrobat and TeX Team Up, *TUGboat* **29**:3 (1999), pp. 196–201.

[2] `ctan.org/pkg/acrotex`

Clarification: Interview with Boris Veytsman, *TUGboat* 43:2

In the subject interview from the TUG 2022 proceedings, the software "Maxima" is referred to several times on pages 103–104. The references begin with this statement by Paulo Ney de Souza, the interviewer:

> I had just started at the time playing with Maxima here and Richard Fateman had brought the Maxima code and had installed it on the VAXes at Berkeley.

Don Knuth, in a message to me, has pointed out that the system brought by Fateman to Berkeley was called "Macsyma", and further says that

> It probably has some historic connection with the system Boris calls "Maxima" on page 133, reference [10]; but page 103 (and also page 104) certainly was not about Joel Moses's pioneering Macsyma system.

The confusion is cleared up in the section entitled "History" on the referenced page (`maxima.sourceforge.io/`):

> Maxima is a descendant of Macsyma, the legendary computer algebra system developed in the late 1960s at the Massachusetts Institute of Technology. It is the only system based on that effort still publicly available and with an active user community, thanks to its open source nature.

So the software referred to by Paulo is "Macsyma", and later references by Boris are to its open source descendant "Maxima".

News from the TeX neighborhood

As expected, the TeX Live 2023 pretest was launched at the beginning of the year. TeX Live 2022 was frozen just before the release of the new edition on March 19. Information regarding the release is on the TUG web pages, at `tug.org/texlive`; the files are also on CTAN. There are a few notable changes:

- Windows binaries are now 64-bit (not 32), and are thus installed in the directory `bin/windows` instead of `bin/win32`.
- The version of ConTeXt is LMTX, based on the new LuaMetaTeX engine by Hans Hagen; the MkII format based on pdfTeX is no longer included (though it may return in some other guise). Binaries are not provided for all possible platforms, but a snapshot of how to build them is present in the TL `source` tree.

- MacTEX includes the `hintview` viewer for Martin Ruckert's `hitex` engine/`hint` output files; Martin is hoping for useful feedback.

The release has been sent for DVD production, and the DVDs should be ready to start mailing by the end of May.

This year's LaTeX update is expected by the end of June. The third edition of *The LaTeX Companion*, now in two volumes, is available for order; it will be published in both print and ebook formats on May 15, 2023. If you start from the links on `latex-project.org` or `tug.org`, you will get a discount and the authors will get a small extra commission.

For users of MetaPost, GUTenberg has established a site devoted to its uses and examples: `metapost.gutenberg-asso.fr`.

The *really* big news is that, after several years of enforced isolation, this year's TUG meeting will finally, once again, be held in person. It will take place in Bonn, Germany, the former capital of West Germany, and Beethoven's birthplace, from July 14–16, with a developer's workshop on "Tagging PDF documents" the day before. Many thanks are due to Ulrike and Gert Fischer, residents of Bonn, who have volunteered to make the local arrangements. By the time you read this, the dates for obtaining rooms at the conference hotel and for proposing a talk will have passed, but it should still be possible to register to attend. Check the conference web page (`tug.org/tug2023`). It's hoped that it will be possible to also make the conference sessions available online, although the schedule will be more "traditional" than it has been during the COVID lockdown, taking place, most likely, from 9 a.m. to 5 p.m. Central European time.

Sadly, the retirement of DANTE's long-time office staff and the difficulty of finding a dedicated replacement has resulted in the inability of DANTE to hold their accustomed Spring meeting. Instead, a brief meeting will be held in Bonn on July 13, prior to the TUG meeting.

A new version of the Lucida font collection has been released. The most significant changes affect the math fonts. Details are reported at `tug.org/pipermail/lucida/2023-January/000921.html`. and in a *TUGboat* article by Hans Hagen and Mikael Sundquist.[3] There's no additional charge for anyone who has already purchased a license.

A potential "alternative" to LaTeX has appeared: Typst (`typst.app`). Developed by two former students of the Technical University of Berlin who "were unhappy with LaTeX and how slow and unwieldy it

was", they undertook to create a replacement written in Rust that would be easier to use while producing output of comparable quality. Not a backslash in sight. A user-focused talk on Typst has been submitted to TUG'23.

The introduction to LaTeX, "Formatting Information" by Peter Flynn, first introduced here in *TUGboat*,[4] has been updated to incorporate recent developments. This online book, now in its 8th edition, is mainly for beginners. The new edition can be found at `http://latex.silmaril.ie/`. Peter requests that bugs, comments, and suggestions be sent to `latex@silmaril.ie`.

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Accessibility for (LA)TEX

Accessibility has become a more and more pressing concern. The LaTeX Team and other members of the TEX community have devoted considerable attention to the problem,[5] as has the W3C MathML Working Group. To the best of my knowledge, not much effort has been made to bring this to the notice of the ordinary scientist, but an article, "Making Accessible Documents Using LaTeX" in the January issue of the AMS *Notices*[6] made a start at remedying that situation. Whether this will result in the desirable changes required from individual authors to make the mathematical literature readily accessible to those readers capable of understanding it or trying to learn the subject matter, is still an unanswerable question, but at least it's emerging from the shadows.

A website, Accessible Mathematics,[7] created and maintained by Abbas Jaffary, presents a comprehensive overview of the problems associated with rendering mathematics accurately, whether spoken, in Braille, or online in visible, non-PDF form. Notation can be ambiguous, depending on context for the exact meaning; relevant examples indicate the extent of the problem. This website addresses not only (LA)TEX, but also many other tools used to record math in electronic form. Included is MathML, which is also being examined in detail for the same purpose.

MathML is the subset of XML dealing specifically with mathematical notation. For several years, the MathML Working Group has been addressing the issues involved in converting files containing MathML code to forms other than publication on paper or as PDF. A mailing list adjunct to their "internal"

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[3] `tug.org/TUGboat/tb43-3/tb135hagen-lucida.pdf`

[4] `tug.org/TUGboat/tb23-2/tb74flynn.pdf`
[5] See `tug.org/twg/accessibility/`
[6] `www.ams.org/journals/notices/202301/rnoti-p68.pdf`
[7] `www.accessiblemath.info/accessible_math_documentation_page.html`

communications allows other interested persons to eavesdrop on their discussions.[8] The current topic is how to communicate "intent" to the tools used for translation to another form. "Intent" is the information necessary to correctly translate visual expressions such as $|x|$ to a contextually appropriate expression. Although the subject matter of a source may provide enough information to disambiguate such expressions, it may be necessary for the author to provide some direction — and it's not guaranteed that all authors will be willing to make the extra effort.

The arXiv project has issued an accessibility research report, "A framework for improving the accessibility of research papers on `arXiv.org`".[9] This is a good overview of the current state of affairs.

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Accessibility — Something completely different

On a tour of the Operations Center for the Chandra X-Ray Observatory (`chandra.si.edu/`), I was surprised to learn about the significant work already accomplished on trying to make the results of astrophysical exploration accessible to those with visual restrictions. Although the wavelengths — short or long — of astronomical objects may be outside the normal range of human vision, the usual adjusted images are still entirely visual.

Two adaptations have been applied to make these images accessible through touch and sound. The resolution of the masses of data collected by Chandra and other orbiting telescopes is exceedingly high, allowing it to be converted to spatial instructions that can drive a 3D printer. The result, for the Cassiopeia A supernova remnant, resembles something spongelike that might be found on a reef, underwater.[10] The Crab Nebula pulsar, on the other hand, rather resembles a piece of exercise equipment — a smooth disc with "handles" emerging from the center on both sides.[11] In the header on the Crab Nebula page, the word "Explore" links to additional examples, all with instructions for setting up a 3D printer to produce the "concrete" object yourself.

"Sonification" is applied to create representations that can be heard. This project was a response to the isolation of the Chandra team members during the coronavirus epidemic, since it allowed them to work while physically separated. The team includes individuals with backgrounds in music and sound engineering as well as astrophysics, and a member of the blind community who is an accessibility expert. Instruments and sonic patterns are chosen to represent elements of an image: gas by drones, individual stars or points of light by struck or plucked instruments, with volume representing brightness, and pitch, the wavelength or color. A selection of these sonic images has been linked as YouTube offerings, with the decisions applying to each image described in clear detail along with the video presentation.[12] A collection of the audio selections will be made available (on vinyl!) with proceeds to go to the Helen Keller Foundation.

Finally, a typographic note: As we entered the suite, we were greeted by an impressive identification spelled out in relief. The font is a relative of "Bank Gothic", designed by Morris Fuller Benton in the early 1930s for American Type Founders (ATF). Elegant and appropriate, in my opinion.

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An afternoon at the Museum of Printing

The Museum of Printing (MoP), located in Haverhill, Massachusetts, is a treasure trove of just about everything to do with the printing tradition. (They have also agreed to be the repository for my papers and library dealing with math typography and TeX.)

One event held at MoP in November was a conversation between Frank Romano, president of the museum, and Matthew Carter, type designer extraordinaire. Rather than a formal lecture, this was an informal interchange, sharing common background (Romano and Carter were both, for a while in the 1960s–70s, employed by the Mergenthaler Linotype Corporation in New York City), and exploring Carter's history and various pursuits in the industry.

Born in England shortly before the Second World War, Carter shared some early memories of life during that period. He wasn't aware of his father's profession (book designer and print historian) until his basic education was complete, and he was ready

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[8] Send a message to `www-math-request@w3.org` with the subject "subscribe".

[9] `info.arxiv.org/about/accessibility_research_report.html`

[10] A typical photograph, processed by NASA, can be seen at `solarsystem.nasa.gov/resources/822/cassiopeia-a-supernova-remnant/`. The 3D image appears toward the bottom of this page: `chandra.si.edu/deadstar/deadstar.html`.

[11] Near the bottom of the page at `chandra.si.edu/deadstar/crab.html`.

[12] `chandra.si.edu/sound/`

to enter university. But before he headed to Oxford, he spent an intern year at the Enschedé type foundry in Haarlem, where he learned to cut punches, the basis for creating molds from which individual metal types are cast. Having enjoyed this experience, Carter did not enter Oxford as intended (a decision approved by his father), but delved into the world of type design, which at that very moment was moving away from metal to phototype.

After gaining more experience in London, including the use of mylar drafting film as a medium on which to draw letter images, Carter moved to New York in 1960, where he joined Mergenthaler with Mike Parker as a sponsor. Rather than submitting his drawings to the draftsmen who were tasked with creating the reversed-direction formal drawings used for the production of the punches and matrices from which metal type was struck, Carter drew his letters on drafting film in the right-reading direction, from which they were transferred to photographic film using a large graphics camera that was carefully "insulated" from vibration on a granite bench. (The complete run of formal drawings, for every metal font ever produced by Mergenthaler, is in the MoP archives.)

On November 9, 1965, while Carter was in his office at Mergenthaler, all the lights went out. He looked out his window, and there were no lights anywhere, including at the nearby Brooklyn Navy Yard. This was the great East Coast blackout, caused by the failure of a relay at a hydroelectric power plant near Niagara Falls. A cascade of failures along the transmission grid caused the lights to go out over most of the Northeast U.S. and all of Ontario. Carter named the font he was working on at the time "Cascade". (In Rhode Island, I was riding home from the office on a Vespa when the lights went out; it was a memorable experience.)

Until the phototype revolution, Mergenthaler had based its business on hardware. But with phototype, the ability to create fonts became less closely tied to the hardware, and an effort to persuade the company to consider fonts as a separate center of effort failed. Carter and Mike Parker left Mergenthaler to form Bitstream, which specialized in fonts, migrating from phototype to digital type as typesetting methods changed, creating new versions of old familiar fonts and developing new ones both for general use and under commission for such well-known institutions as the *New York Times* and Yale University.

Since 1992, Carter has been associated with Carter & Cone. He is still actively designing type, an occupation which seems to interest him more than any hobby. A more detailed biography appears

online in Wikipedia[13] and the conversation at MoP has been recorded and can be viewed on the MoP channel on YouTube. The transcript, with links, appears later in this issue.
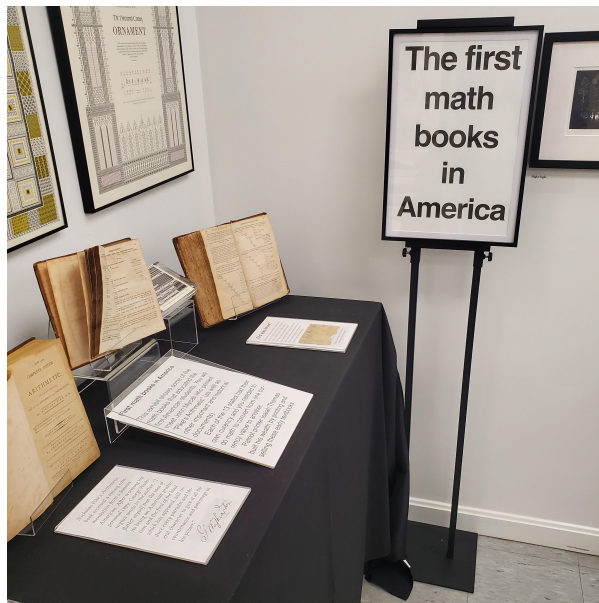
In addition to this event and the permanent displays of presses, related hardware, and their printed products, a topical exhibition at MoP of particular interest to me was a copy of the first math book printed in America: *Arithmetick Vulgar and Decimal*, by Isaac Greenwood, published in Boston in 1729. Along with several volumes and leaves from other early works, a pleasing display occupied a sizeable table.

A complementary item to the Carter-Romano conversation, found quite by chance as an internet posting,[14] celebrates Matthew Carter's Jubilee — 50 years as a type designer. Published in 2005, its text is bilingual, in Czech and English — TYPO: *typografie. grafický design. vizuální komunikace/typography. graphic design. visual communication*. The booklet consists of three main parts: an essay by Margaret Re, "A Typographic Jubilee for Matthew Carter"; an interview with Carter by Adam Twardoch;[15] and an illustrated catalog of the fonts designed by Carter. The interview covers the same territory as the conversation with Romano, perhaps slanted a bit more toward a European audience. Recommended reading.

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[13] en.wikipedia.org/wiki/Matthew_Carter
[14] twardoch.com/download/TYPO_2005_18_Carter.pdf
[15] Adam Twardoch, an active type designer, is currently president of GUST.

Arsenic and old books

The Providence Athenæum, a membership library established in 1836, sponsors a wide variety of lectures and salons on the general subject of books. On 24 March 2023, the topic was the presence of poisonous materials in 19th century bookbinding and printing. The presenter, Dr. Melissa Tedone, is Book & Library Conservator at the Winterthur Museum, Garden, and Library in Wilmington, Delaware.

Until the mid-19th century, most dyes and colorants produced rather subdued hues. Beginning in the Victorian era, more exuberant coloring agents became available. These were received avidly by the growing middle class, whose wealth was also increasing and allowed purchases beyond necessities, like books. Unfortunately, many of these new colors incorporated toxic compounds based on heavy metals — arsenic, chrome, lead and mercury.

While restoring a bright green book cover, Dr. Tedone noticed that tiny colored bits were flaking off, leaving a residue on her hands and the work area. She stopped work and took a sample of the residue to the lab for analysis. Tests identified the material as containing copper acetoarsenite, a dangerously toxic compound that exceeded the measuring limit of the lab's test equipment. The book's color is known as "emerald green", the same compound as "Paris green", used to poison rats in the sewers of Paris.

In the 1850s and '60s, for books published in England and the U.S., book cloth was coated with the coloring agent, not dyed. This coating flakes off readily with use. In France and Germany, from the 1830s through the end of the century, the same toxic agents colored the inks printed on paste papers used instead of cloth for covering books. Toxic inks also colored illustrations within books. Another notable use of emerald green was in the colorful wallpaper patterns crated by William Morris.

These toxic compounds were in common use during the period: copper acetoarsenite (brilliant green); mercury (red); chrome and lead (yellow and orange). It's recommended that if you find such a brightly colored 19th century book on your shelves, enclose it in an airtight plastic bag and seek professional guidance.

In-person attendees at the Athenæum received a keepsake, a bookmark printed with green edge strips, one matching the shade typical of books bound in book cloth, and the other matching paste-paper bindings. A video[16] records the simultaneous Zoom presentation, and if you want to obtain a copy of the bookmark, the Winterthur wiki[17] provides instructions for how to do so, as well as a wealth of other information on handling suspect books.

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How many TeX documents?

A question from Chuck Bigelow might benefit from wider consideration:

> ... how many mathematics, physics, economics, engineering, chemistry, biology papers have been prepared for publication or distribution (e.g. technical reports, theses, pdfs) with TeX since 1982?
> Or from 1979 to 2023 in any version and including forks and branches and other scientific and scholarly disciplines?

Where can we look for relevant information?

I can provide information on the use of TeX by the American Mathematical Society, where TeX has been used for published documents since 1982.

Some publishers of scientific books and journals accept submissions in LaTeX, but farm out the files for conversion to XML, which is the archival medium. Elsevier and Springer are in this group.

ArXiv, the repository of papers in math, physics, and other "hard" sciences, reports well over 2 million items in their holdings. They are probably willing to divulge what part of this is in TeX form.

Another source of LaTeX document preparation is Overleaf, which is limited strictly to TeX-based activity. They will have a sizeable presence at TUG '23, and I will inquire after their statistics.

Nelson Beebe's growing collection of bibliographies includes several that cover the core TeX-related canon, and other collections for fields that are known heavy users of TeX. Nelson is also expected at TUG'23.

This is a bit of a research project, and suggestions for questions to ask and likely candidates to be asked are welcome. Send your suggestions to me at TUGboat@tug.org. The results will be presented in a followup report.

⋄ Barbara Beeton
https://tug.org/TUGboat

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[16] providenceathenaeum.org/media-archives/the-poison-book-project/

[17] http://wiki.winterthur.org/wiki/Poison_Book_Project#Emerald_Green_Color_Swatch_Bookmark