MAKING GUST e-FOUNDRY RESOURCES AVAILABLE

Bogusław Jackowski

BachoTEX 2025

30 IV – 4 V

INTRO – WHICH RESOURCES?

The main asset of the GUST e-Foundry, which we've been preparing for release for some time now – although at a slower pace than we'd prefer – is our font generation software. METAPOST is at the heart of the system, serving as the main tool for generating letterforms as EPS files (and TFM files for TEX, if needed). These EPS files are then processed using additional tools – Python, FontForge, and T1utils – to convert them into widely accepted font formats. In our case, that means PostScript Type 1 and OpenType fonts.

INTRO – WHICH RESOURCES?

The main asset of the GUST e-Foundry, which we've been preparing for release for some time now – although at a slower pace than we'd prefer – is our font generation software. METAPOST is at the heart of the system, serving as the main tool for generating letterforms as EPS files (and TFM files for TEX, if needed). These EPS files are then processed using additional tools – Python, FontForge, and T1utils – to convert them into widely accepted font formats. In our case, that means PostScript Type 1 and OpenType fonts. The results of our work have been available for many years now and include the following:

- TEXT FONTS:
  - the *Latin Modern* family
  - the *Antykwa Półtawskiego* family
  - the *TEX Gyre* collection (*Adventor*, *Bonum*, *Cursor*, *Chorus*, *Heros*, *Heros Condensed*, *Pagella*, *Schola*, *Termes*)
- MATH FONTS:
  - *Latin Modern Math*, *TEX Gyre Bonum Math*, *TEX Gyre Pagella Math*, *TEX Gyre Schola Math*, *TEX Gyre Termes Math*, *TEX Gyre DejaVu Math*

LONG WALK TO RELEASE

We started out with a system called METATYPE1 (2000), designed to generate PostScript Type 1 fonts. But it didn't take long for the tide to turn: OpenType became the new standard – or, should we say, the latest fashion? – and Type 1 fonts became obsolescent.

LONG WALK TO RELEASE

We started out with a system called METATYPE1 (2000), designed to generate PostScript Type 1 fonts. But it didn't take long for the tide to turn: OpenType became the new standard – or, should we say, the latest fashion? – and Type 1 fonts became obsolescent.

For a while, METATYPE1 remained in use, aided by Adobe's Font Development Kit for OpenType (AFDKO), which allowed us to convert METATYPE1-generated PostScript fonts into OpenType fonts.

LONG WALK TO RELEASE

We started out with a system called METATYPE1 (2000), designed to generate PostScript Type 1 fonts. But it didn't take long for the tide to turn: OpenType became the new standard – or, should we say, the latest fashion? – and Type 1 fonts became obsolescent.

For a while, METATYPE1 remained in use, aided by Adobe's Font Development Kit for OpenType (AFDKO), which allowed us to convert METATYPE1-generated PostScript fonts into OpenType fonts.

At some point, we felt the urge to create math fonts in OpenType format (released in 2007) – after all, TEX was designed with mathematical typesetting in mind.

LONG WALK TO RELEASE

We started out with a system called METATYPE1 (2000), designed to generate PostScript Type 1 fonts. But it didn't take long for the tide to turn: OpenType became the new standard – or, should we say, the latest fashion? – and Type 1 fonts became obsolescent.

For a while, METATYPE1 remained in use, aided by Adobe's Font Development Kit for OpenType (AFDKO), which allowed us to convert METATYPE1-generated PostScript fonts into OpenType fonts.

At some point, we felt the urge to create math fonts in OpenType format (released in 2007) – after all, TEX was designed with mathematical typesetting in mind.

But AFDKO alone wasn't enough. What we needed was FontForge, developed by George Williams, which was capable of generating OpenType math fonts. With a Python interface added by Piotr Strzelczyk, METATYPE1 became what we called FFDKO.

LONG WALK TO RELEASE

Piotr's successful approach inspired us to consider switching entirely to FontForge – that is, using METAPOST just to generate EPS files, without the intermediate PostScript font stage. Marek Ryćko supported this move by implementing, on the basis of Piotr's FFDKO, a system he named Algotype. Algotype was later passed on to Ryszard Kubiak, who renamed it Fontplant.

LONG WALK TO RELEASE

Piotr's successful approach inspired us to consider switching entirely to FontForge – that is, using METAPOST just to generate EPS files, without the intermediate PostScript font stage. Marek Ryćko supported this move by implementing, on the basis of Piotr's FFDKO, a system he named Algotype. Algotype was later passed on to Ryszard Kubiak, who renamed it Fontplant.

Fontplant preserved the key idea of controlling FontForge through a scripted Python interface. So, since the Algotype days, METAPOST has been used solely for generating EPS files, while the rest of the work is handled by FontForge, orchestrated by a suite of Python scripts.

LONG WALK TO RELEASE

Piotr's successful approach inspired us to consider switching entirely to FontForge – that is, using METAPOST just to generate EPS files, without the intermediate PostScript font stage. Marek Ryćko supported this move by implementing, on the basis of Piotr's FFDKO, a system he named Algotype. Algotype was later passed on to Ryszard Kubiak, who renamed it Fontplant.

Fontplant preserved the key idea of controlling FontForge through a scripted Python interface. So, since the Algotype days, METAPOST has been used solely for generating EPS files, while the rest of the work is handled by FontForge, orchestrated by a suite of Python scripts.

Well… not entirely.

For instance, some fine details in the PostScript fonts generated by FontForge – like special comments or floating-point character widths, which we've grown rather fond of – are still handled using the old but gold T1utils package by Lee Hetherington, which patches up the fonts after they come out of FontForge.

LONG WALK TO RELEASE

As you can see from the above, we've had a hard time keeping up with the ever-changing world of fonts. This has been especially true given the issues we've encountered with the tools used for font processing. As I mentioned in my previous talk, this has repeatedly delayed the release of the software developed and used by the GUST e-Foundry.

LONG WALK TO RELEASE

As you can see from the above, we've had a hard time keeping up with the ever-changing world of fonts. This has been especially true given the issues we've encountered with the tools used for font processing. As I mentioned in my previous talk, this has repeatedly delayed the release of the software developed and used by the GUST e-Foundry.

Still, we're hopeful that we'll be able to publish at least the software for generating text fonts quite soon. In fact, we're now in the final stages: Ryszard is putting the finishing touches on the documentation – and, as you all know, thorough documentation always leads to amendments in the code itself.

LONG WALK TO RELEASE

As you can see from the above, we've had a hard time keeping up with the ever-changing world of fonts. This has been especially true given the issues we've encountered with the tools used for font processing. As I mentioned in my previous talk, this has repeatedly delayed the release of the software developed and used by the GUST e-Foundry.

Still, we're hopeful that we'll be able to publish at least the software for generating text fonts quite soon. In fact, we're now in the final stages: Ryszard is putting the finishing touches on the documentation – and, as you all know, thorough documentation always leads to amendments in the code itself.

The good news is that the software, in its current state, already processes – correctly, in our view – the text font families I referred to at the beginning. We plan to release the new version of those fonts shortly after the Bachotek meeting. In the next part of my talk, I'll go into more details about this particular font set.

FONTS WE'RE GOING TO RE-PUBLISH

All of these fonts are available both on the GUST website and in the CTAN repository – the Antykwa Półtawskiego family from 2010, the Latin Modern family from 2009, and the TEX Gyre collection from 2009 and 2018.

FONTS WE'RE GOING TO RE-PUBLISH

All of these fonts are available both on the GUST website and in the CTAN repository – the Antykwa Półtawskiego family from 2010, the Latin Modern family from 2009, and the TEX Gyre collection from 2009 and 2018.

In most cases, this new, revised release should produce almost identical results. Only a few fonts from the TEX Gyre collection have changed – a few new characters have been added, and some glyphs have been slightly modified. Additionally, the previously published versions of TEX Gyre Schola and TEX Gyre Termes (from 2009) did not include anchors for positioning accents – the current versions of these fonts are now equipped with such anchors.

FONTS WE'RE GOING TO RE-PUBLISH
ANTYKWA PÓŁTAWSKIEGO FAMILY

Our Antykwa Półtawskiego font family includes two weight variants (light and normal). Each weight is further divided into five width subfamilies: expanded, semi-expanded, normal, semi-condensed, and condensed. Every subfamily contains four styles: regular, regular italic, bold, and bold italic.

FONTS WE'RE GOING TO RE-PUBLISH
ANTYKWA PÓŁTAWSKIEGO FAMILY

Our Antykwa Półtawskiego font family includes two weight variants (light and normal). Each weight is further divided into five width subfamilies: expanded, semi-expanded, normal, semi-condensed, and condensed. Every subfamily contains four styles: regular, regular italic, bold, and bold italic.

This four-style structure is, of course, a nod to the way fonts are traditionally handled in Windows, though this structure wasn't fully in place in 2010.

FONTS WE'RE GOING TO RE-PUBLISH
ANTYKWA PÓŁTAWSKIEGO FAMILY

Our Antykwa Półtawskiego font family includes two weight variants (light and normal). Each weight is further divided into five width subfamilies: expanded, semi-expanded, normal, semi-condensed, and condensed. Every subfamily contains four styles: regular, regular italic, bold, and bold italic.

	LIGHT				NORMAL			
	regular	regular italic	bold	bold italic	regular	regular italic	bold	bold italic
expanded	antpl6	antpli6	antpm6	antpmi6	antpr6	antpri6	antpb6	antpbi8
semi expanded	antpl8	antpli8	antpm8	antpmi8	antpr8	antpri8	antpb8	antpbi8
normal	antpl10	antpli10	antpm10	antpmi10	antpr10	antpri10	antpb10	antpbi10
semi condensed	antpl12	antpli12	antpm12	antpmi12	antpr12	antpri12	antpb12	antpbi12
condensed	antpl17	antpli17	antpm17	antpmi17	antpr17	antpri17	antpb17	antpbi17

FONTS WE'RE GOING TO RE-PUBLISH
ANTYKWA PÓŁTAWSKIEGO FAMILY

Our Antykwa Półtawskiego font family includes two weight variants (light and normal). Each weight is further divided into five width subfamilies: expanded, semi-expanded, normal, semi-condensed, and condensed. Every subfamily contains four styles: regular, regular italic, bold, and bold italic.

	LIGHT				NORMAL			
	regular	regular italic	bold	bold italic	regular	regular italic	bold	bold italic
expanded	antpl6	antpli6	antpm6	antpmi6	antpr6	antpri6	antpb6	antpbi8
semi expanded	antpl8	antpli8	antpm8	antpmi8	antpr8	antpri8	antpb8	antpbi8
normal	antpl10	antpli10	antpm10	antpmi10	antpr10	antpri10	antpb10	antpbi10
semi condensed	antpl12	antpli12	antpm12	antpmi12	antpr12	antpri12	antpb12	antpbi12
condensed	antpl17	antpli17	antpm17	antpmi17	antpr17	antpri17	antpb17	antpbi17

It's worth mentioning that, while the four-style structure hadn't been fully implemented in 2010, all 600 new TFM files for Antykwa Półtawskiego are identical to those from that year.

FONTS WE'RE GOING TO RE-PUBLISH
LATIN MODERN FAMILY

The Latin Modern font family consists of 72 fonts and has a rather complex internal structure – much like Computer Modern, from which it descends. The structure is complicated enough that covering it in detail would go beyond the scope of this talk. I'll just note that the fonts couldn't be grouped into four-style subfamilies, but we did improve the internal organization compared to the 2009 version.

FONTS WE'RE GOING TO RE-PUBLISH
LATIN MODERN FAMILY

The Latin Modern font family consists of 72 fonts and has a rather complex internal structure – much like Computer Modern, from which it descends. The structure is complicated enough that covering it in detail would go beyond the scope of this talk. I'll just note that the fonts couldn't be grouped into four-style subfamilies, but we did improve the internal organization compared to the 2009 version.

As for the TFM files, nearly all of them – 572 out of 576 – are identical to those from 2009. The few differences stem from a long-standing error that had been living unnoticed in the fonts lmr12, lmro12, lmr17, and lmro17 for 16 years. Specifically, the height of the lowercase 'ł' in lmr12 and lmro12, as well as the uppercase 'Ł' in lmr17 and lmro17, was set to zero. Fixing this issue caused the new files to differ from the old ones – but I hope you'll agree it's a welcome improvement.

FONTS WE'RE GOING TO RE-PUBLISH
TEX GYRE COLLECTION

The TEX Gyre font collection includes eight families, each available in four styles – regular, italic, bold, and bold italic: Adventor, Bonum, Cursor, Heros, Heros Condensed, Pagella, Schola, and Termes. Additionally, the collection includes Chorus – a standalone chancery-style italic font.

FONTS WE'RE GOING TO RE-PUBLISH
TEX GYRE COLLECTION

The TEX Gyre font collection includes eight families, each available in four styles – regular, italic, bold, and bold italic: Adventor, Bonum, Cursor, Heros, Heros Condensed, Pagella, Schola, and Termes. Additionally, the collection includes Chorus – a standalone chancery-style italic font.

Some of the fonts – namely Adventor, Pagella, Schola, and Termes – have been equipped with so-called anchors, which help with the accurate positioning of diacritical marks.

FONTS WE'RE GOING TO RE-PUBLISH
TEX GYRE COLLECTION

The TEX Gyre font collection includes eight families, each available in four styles – regular, italic, bold, and bold italic: Adventor, Bonum, Cursor, Heros, Heros Condensed, Pagella, Schola, and Termes. Additionally, the collection includes Chorus – a standalone chancery-style italic font.

Some of the fonts – namely Adventor, Pagella, Schola, and Termes – have been equipped with so-called anchors, which help with the accurate positioning of diacritical marks. We chose not to include anchors in the remaining TEX Gyre fonts, as it's a time-consuming task and, based on our experience, doesn't significantly increase a font's practical value or appeal. It was an interesting road to explore, but we believe that four anchored families are enough.

FONTS WE'RE GOING TO RE-PUBLISH
TEX GYRE COLLECTION

The TEX Gyre font collection includes eight families, each available in four styles – regular, italic, bold, and bold italic: Adventor, Bonum, Cursor, Heros, Heros Condensed, Pagella, Schola, and Termes. Additionally, the collection includes Chorus – a standalone chancery-style italic font.

Some of the fonts – namely Adventor, Pagella, Schola, and Termes – have been equipped with so-called anchors, which help with the accurate positioning of diacritical marks. We chose not to include anchors in the remaining TEX Gyre fonts, as it's a time-consuming task and, based on our experience, doesn't significantly increase a font's practical value or appeal. It was an interesting road to explore, but we believe that four anchored families are enough.

These four fonts have also been enriched with a broader character repertoire. However, while this too is a labor-intensive effort, it likewise does not seem to make a major difference in how attractive or useful the fonts are in everyday typesetting.

FONTS WE'RE GOING TO RE-PUBLISH
TEX GYRE COLLECTION

The TEX Gyre font collection includes eight families, each available in four styles – regular, italic, bold, and bold italic: Adventor, Bonum, Cursor, Heros, Heros Condensed, Pagella, Schola, and Termes. Additionally, the collection includes Chorus – a standalone chancery-style italic font.

In this case, the 488 TEX Gyre TFM files generally differ from their counterparts in previous versions. However, with the exception of the TEX Gyre Schola and TEX Gyre Termes fonts, the changes are practically negligible. If anyone's curious about the details, I'm happy to chat more during the breaks – I did put together a thorough discrepancy report, though to be honest, even I don't find it particularly riveting reading. As for the two mentioned fonts, they've simply undergone a bit of a facelift – and while the changes are technically significant, most users probably won't notice them in practice.

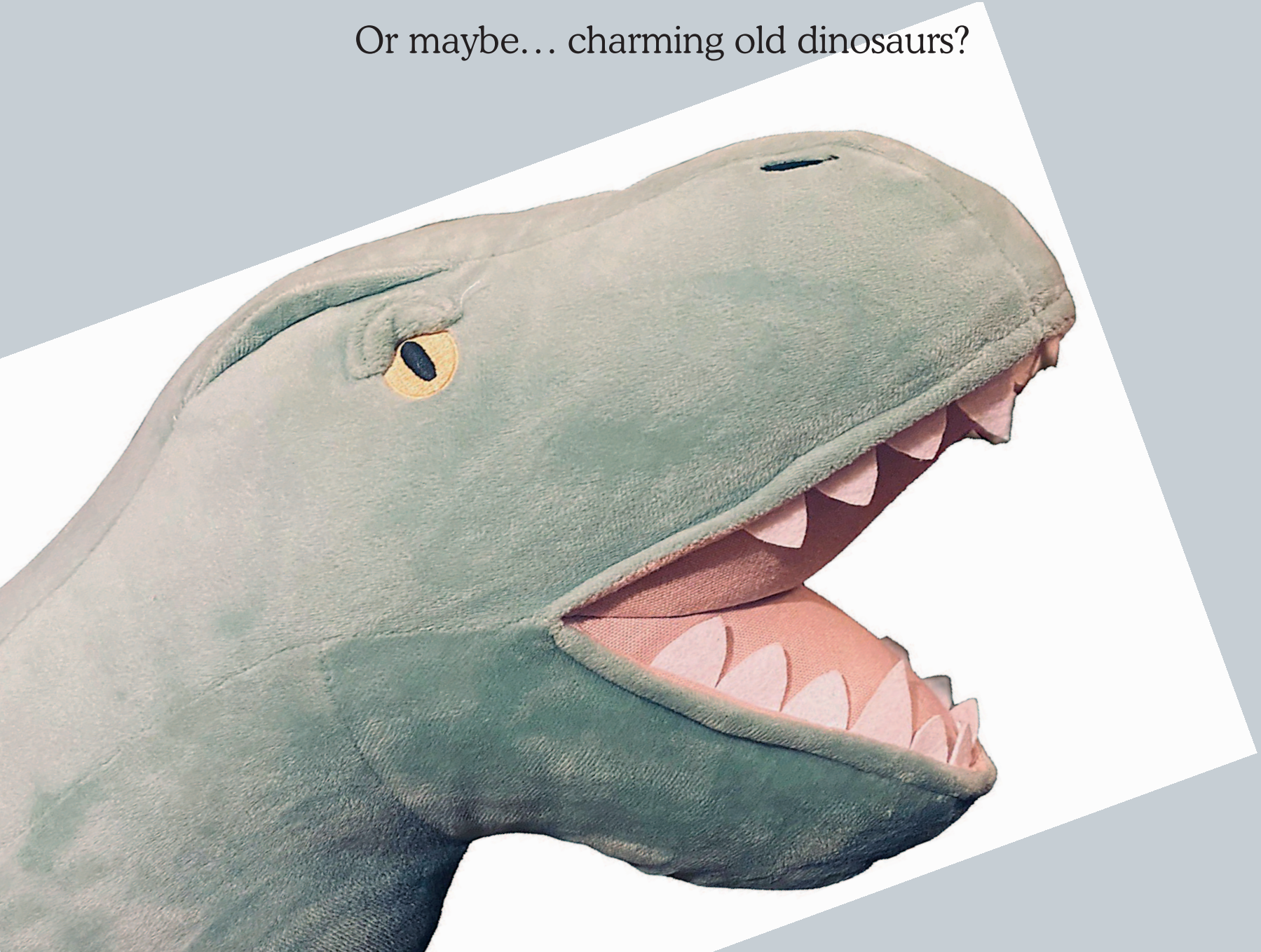
WHO EVEN CARES ABOUT TFM FILES?

WHO EVEN CARES ABOUT TFM FILES?

Rusty old dinosaurs?

WHO EVEN CARES ABOUT TFM FILES?

Or maybe… charming old dinosaurs?



WHO EVEN CARES ABOUT TFM FILES?

I think it's safe to assume that the number of TEX users who still rely on TFM files keeps shrinking, and by now there are only a few oldskull TEXers left – those die-hards still sticking to the classic setup: TFM files plus bitmap PK fonts. Or, the slightly more modern few – like myself – who pair TFM files with PostScript Type 1 fonts (that is, PFB files). Most TEX users today prefer OpenType fonts with newer engines like LuaTEX or XƎTEX – which, honestly, is entirely understandable.

WHO EVEN CARES ABOUT TFM FILES?

I think it's safe to assume that the number of TEX users who still rely on TFM files keeps shrinking, and by now there are only a few oldskull TEXers left – those die-hards still sticking to the classic setup: TFM files plus bitmap PK fonts. Or, the slightly more modern few – like myself – who pair TFM files with PostScript Type 1 fonts (that is, PFB files). Most TEX users today prefer OpenType fonts with newer engines like LuaTEX or XƎTEX – which, honestly, is entirely understandable.

It's worth noting that our work at GUST e-Foundry on fonts in formats other than the native TEX bitmap PK fonts – starting with PostScript Type 1, and later OpenType – was motivated by a desire to make so-called "TEX fonts" usable beyond the TEX environment.

WHO EVEN CARES ABOUT TFM FILES?

I think it's safe to assume that the number of TEX users who still rely on TFM files keeps shrinking, and by now there are only a few oldskull TEXers left – those die-hards still sticking to the classic setup: TFM files plus bitmap PK fonts. Or, the slightly more modern few – like myself – who pair TFM files with PostScript Type 1 fonts (that is, PFB files). Most TEX users today prefer OpenType fonts with newer engines like LuaTEX or XƎTEX – which, honestly, is entirely understandable.

It's worth noting that our work at GUST e-Foundry on fonts in formats other than the native TEX bitmap PK fonts – starting with PostScript Type 1, and later OpenType – was motivated by a desire to make so-called "TEX fonts" usable beyond the TEX environment. I can't say how widely our non-TEX-format fonts are actually used, but they've definitely been noticed – even by folks outside the TEXnician circle.

WHO EVEN CARES ABOUT TFM FILES?

I think it's safe to assume that the number of TEX users who still rely on TFM files keeps shrinking, and by now there are only a few oldskull TEXers left – those die-hards still sticking to the classic setup: TFM files plus bitmap PK fonts. Or, the slightly more modern few – like myself – who pair TFM files with PostScript Type 1 fonts (that is, PFB files). Most TEX users today prefer OpenType fonts with newer engines like LuaTEX or XƎTEX – which, honestly, is entirely understandable.

It's worth noting that our work at GUST e-Foundry on fonts in formats other than the native TEX bitmap PK fonts – starting with PostScript Type 1, and later OpenType – was motivated by a desire to make so-called "TEX fonts" usable beyond the TEX environment.

For the reasons mentioned above, we've put considerable effort into ensuring the fonts install correctly on Windows.

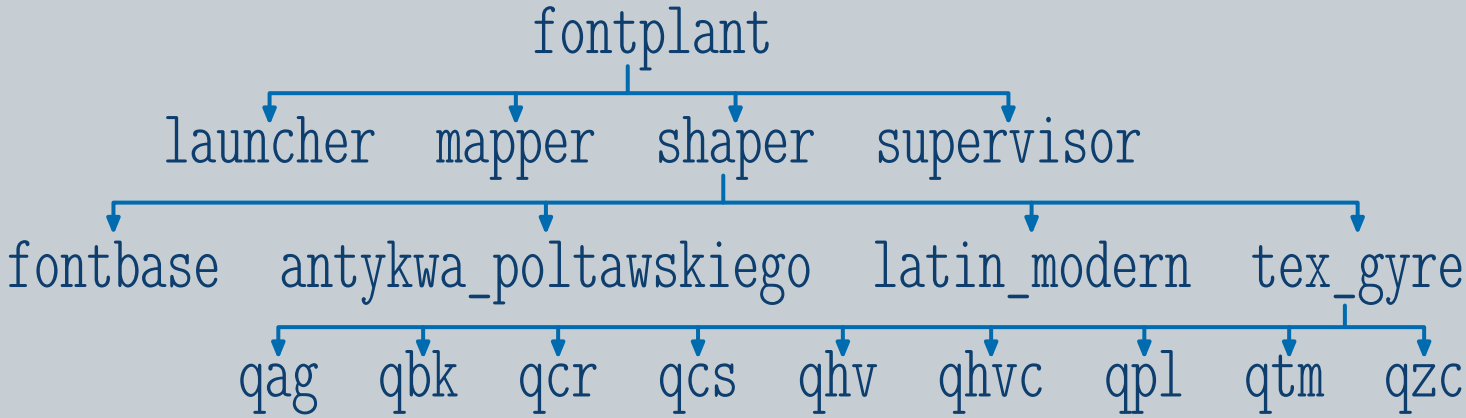
We currently lack access to macOS, and would appreciate assistance in verifying whether our fonts are recognized as valid on that platform.

HOW IT RUNS?

The supervising module for font generation needs to handle file names – and in the case of fonts, also internal font names and glyph names – as well as the locations of programs, source files, and output files.

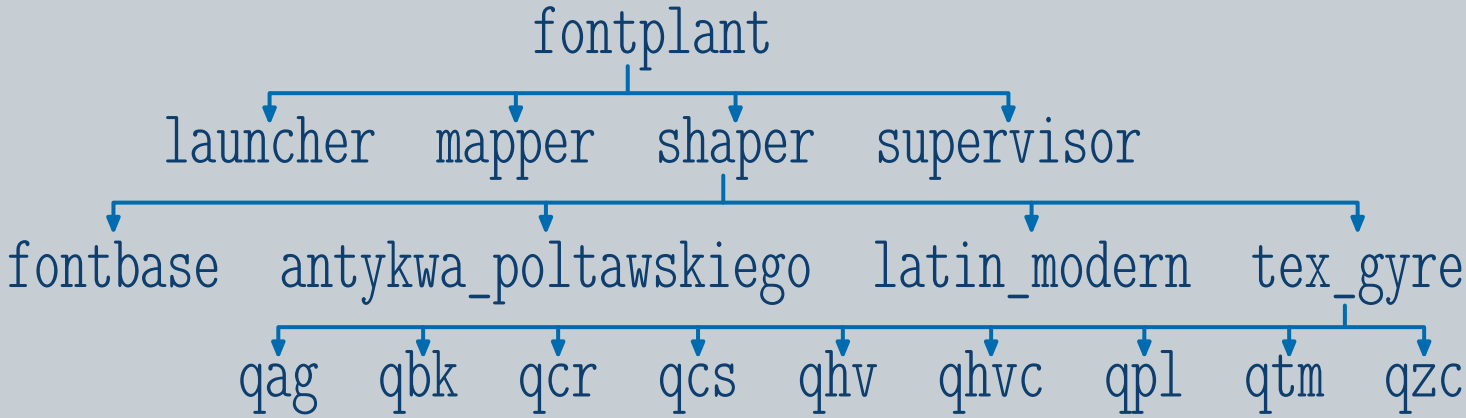
HOW IT RUNS?

Fontplant directory structure



HOW IT RUNS?

Fontplant directory structure

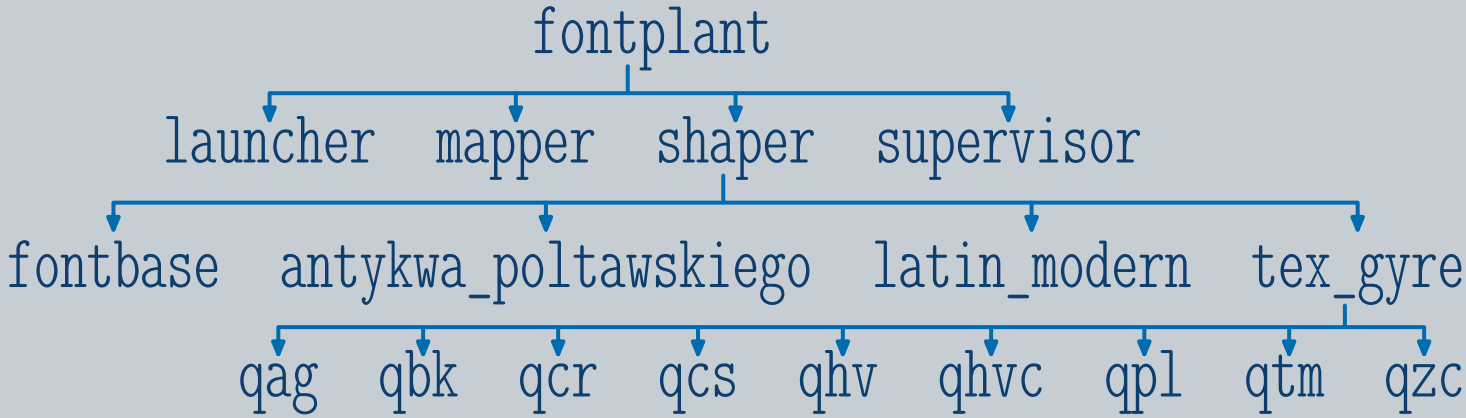


batch file

```
:: shortcuts and dramatis personae:
set _BAT="C:\Program Files (x86)\FontForgeBuilds\ffpython.bat"
set _RUN=C:\fontplant\supervisor\runner.py
set _DIR=C:\fontplant
set _LAU=%_DIR%\launcher
set _RES=C:\fontplant-results
set _DAT=2025-05-01-AP
set _LOG=fontplant-err-%_DAT%

call %_BAT% %_RUN% %_DIR% %_LAU%\bonds-4BX.txt %_RES%\%_DAT% 2>> %_LOG%
```

HOW IT RUNS?

Fontplant directory structure



bonds file

```
FNT:antpb10  GRP:antykwa_poltawskiego GOA:goadb.txt  HDR:AP_headers.dat
PFB:antpb10
OTF:antpolt-bold                      FEA:AP_fea.dat
MPE:e-qx     TFM:qx-antpb10           PSE:ap-qx      PSI:encapqx
MPE:e-qxsc   TFM:qx-antpb10-sc        PSE:ap-qxsc    PSI:encapqxsc
MAP:ap
```

HOW IT RUNS?

glyph order and alias data base (GOADB)

uni2126	ohm	uni2126	PFB_AS_MP
uni2126	Ohm	uni2126	
uni2127	mho	uni2127	PFB_AS_MP
uni2128	Z.fra	uni2128	
uni2129	iotaturned	uni2129	
uni212A	kelvin	uni212a	
uni212B	angstrom	uni212b	
uni212C	B.cal	uni212c	
uni212D	C.fra	uni212d	
uogonek	uogonek	uni0173	
uogonek.sc	uogonek.sc	?	
upsilon	upsilon	uni03c5	
upsilondieresis	upsilondieresis	uni03cb	
upsilontonos	upsilontonos	uni03cd	
uring	uring	uni016f	
uring.sc	uring.sc	?	

HOW IT RUNS?

MP-generated olio typgraphic information file (OTI)

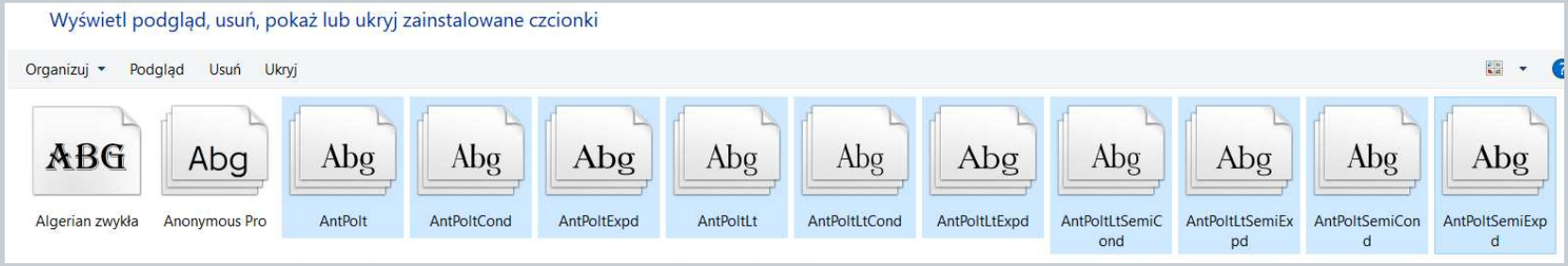
```
FNT FAMILY_NAME AntPolt
FNT FONT_NAME AntPolt-Bold
FNT FULL_NAME AntPolt-Bold
FNT STYLE_NAME Bold

. . .

GLY mho CODE -1
GLY mho EPS 1326
GLY mho WD 756 HT 712 DP 0 IC 6
GLY mho HSBW 756
GLY mho BBX 22 0 734 712

. . .

GLY uogonek CODE 184
GLY uogonek EPS 284
GLY uogonek WD 565 HT 440 DP -240 IC 6
GLY uogonek HSBW 565
GLY uogonek BBX 7 -216 543 452
```

GUST e-FOUNDRY IN THE WINDOWS FONT PANEL

The pictures below show the GUST e-Foundry OpenType fonts installed on Windows. PostScript fonts might have been installed as well, though I'm not sure it's advisable.

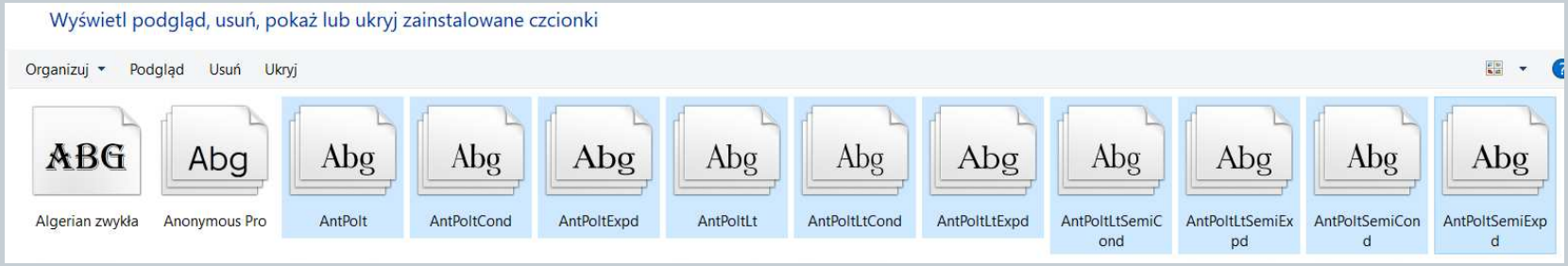
GUST e-FOUNDRY IN THE WINDOWS FONT PANEL

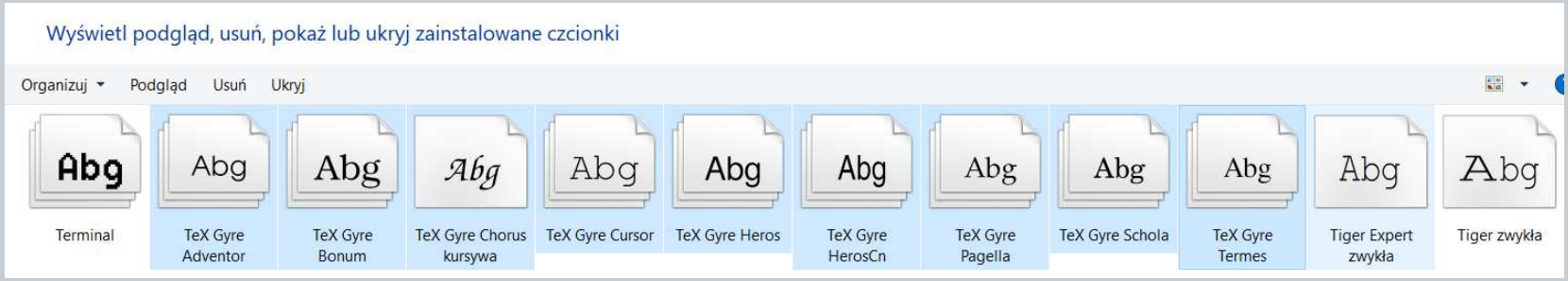
The pictures below show the GUST e-Foundry OpenType fonts installed on Windows. PostScript fonts might have been installed as well, though I'm not sure it's advisable.



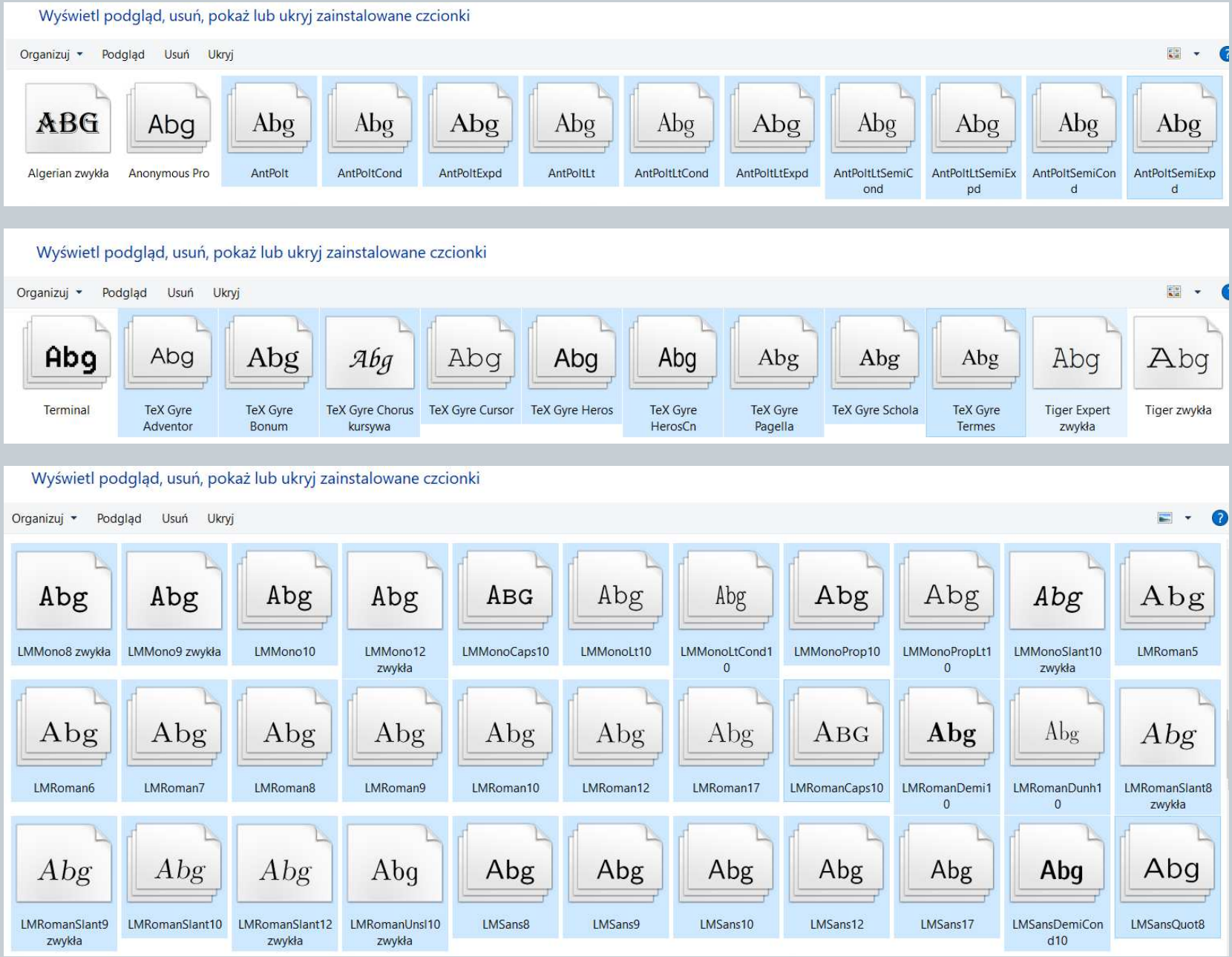
GUST e-FOUNDRY IN THE WINDOWS FONT PANEL

The pictures below show the GUST e-Foundry OpenType fonts installed on Windows. PostScript fonts might have been installed as well, though I'm not sure it's advisable.





GUST e-FOUNDRY IN THE WINDOWS FONT PANEL



ALL IN ALL

Our plans at GUST e-Foundry for the near future are as follows (with apologies for a bit of repetition from the previous talk):

ALL IN ALL

Our plans at GUST e-Foundry for the near future are as follows (with apologies for a bit of repetition from the previous talk):

- Within two weeks after Bachotek, we'll publish the updated fonts on the GUST website. We've made improvements, but we'd be grateful if users could help spot any bugs – especially those that might've slipped in with the switch to Fontplant.

ALL IN ALL

Our plans at GUST e-Foundry for the near future are as follows (with apologies for a bit of repetition from the previous talk):

- Within two weeks after Bachotek, we'll publish the updated fonts on the GUST website. We've made improvements, but we'd be grateful if users could help spot any bugs – especially those that might've slipped in with the switch to Fontplant.
- Next up: publishing Fontplant's well-documented source code on GitHub. Hopefully soon.

ALL IN ALL

Our plans at GUST e-Foundry for the near future are as follows (with apologies for a bit of repetition from the previous talk):

- Within two weeks after Bachotek, we'll publish the updated fonts on the GUST website. We've made improvements, but we'd be grateful if users could help spot any bugs – especially those that might've slipped in with the switch to Fontplant.
- Next up: publishing Fontplant's well-documented source code on GitHub. Hopefully soon.
- And if all goes well, we'd love to also share the source code behind the OpenType math fonts. No promises, but we're working on it.

ALL IN ALL

Our plans at GUST e-Foundry for the near future are as follows (with apologies for a bit of repetition from the previous talk):

- Within two weeks after Bachotek, we'll publish the updated fonts on the GUST website. We've made improvements, but we'd be grateful if users could help spot any bugs – especially those that might've slipped in with the switch to Fontplant.
- Next up: publishing Fontplant's well-documented source code on GitHub. Hopefully soon.
- And if all goes well, we'd love to also share the source code behind the OpenType math fonts. No promises, but we're working on it.

Fingers crossed – and thanks for staying with us this long!


LET'S MEET
AT BACHOTEX
NEXT YEAR