SOUMENDRA GANGULY

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CORE SKILLS

- **C (systems, POSIX)**
- **Python (core, NumPy, SymPy)**
- **HTML, CSS, JavaScript (ES)**
- **Bash, POSIX shell**
- **Rust (actively learning)**
- **Git, Docker, GitHub Actions**
- **Linux, FreeBSD (sys/net admin)**
- **GNU Emacs Lisp, Lua**
- LaTeX, PGF/TikZ

CORE CONTRIBUTIONS

- **Official Python stdlib**
  8vasu.me/cpython-pty
- **Official FreeBSD C stdlib**
  8vasu.me/freebsd-winsize
  8vasu.me/freebsd-winsize-man
- **Official Linux, BSD** *script(1)*
  8vasu.me/util-linux-script
  8vasu.me/freebsd-script
  8vasu.me/netbsd-script
- **Official SymPy**
  8vasu.me/sympy-matrix

PACKAGES

- **Python (PyPI)**
  - pypi.org/project/stty
  - github.com/8vasu/stty.py
- LuaTeX **package on CTAN**
  - ctan.org/pkg/fretplot
  - github.com/8vasu/fretplot
- **GNU Emacs Lisp**
  - github.com/8vasu/compuTeX
  - github.com/8vasu/2windows.el

AI/ML & DATA SCIENCE

- **Geometric Graph Neural Networks**
  github.com/8vasu/gnn.py
- **Local text-to-image generation**
  github.com/8vasu/sg-diffusion
- **Time series electricity pricing**
  github.com/8vasu/power-opsd-dk1

WEB (FULL STACK)

- **Geometric GNNs: Flask back end**
  github.com/8vasu/gnn.py
- **WebAssembly (Pyodide) CAS**
  8vasu.me/plotcat
- **Cmdline interface for arXiv.org**
  github.com/8vasu/paper.py

LANGUAGES

- English, Hindi, Bangla ■■■■■
- Danish (DU3, module 4) ■■■

OTHER SKILLS, EXPERIENCES

- Guitar, breakdance, fine arts
- History, linguistics enthusiast
- Skydiving, paragliding experience

PROFILE

Software engineer and mathematician with **11 years production experience in C and Python**, contributing to CPython (180M+ downloads/month), FreeBSD (1M+ servers), and util-linux (ships with every major Linux distribution).

PROFESSIONAL EXPERIENCE

Researcher, Aarhus University — **Sep 2023–Dec 2025 (fixed-term contract)**

- Led a team of 9 for a year to organize a complex, multi-stakeholder project: a 2-week international conference and summer school with close to 100 participants, including 30 speakers. Was responsible for end-to-end delivery:
  - **Cut conference costs by 47%** (from 840,000 DKK to 450,000 DKK) through vendor negotiations and logistics improvement.
  - Managed daily catering, accommodation of guests, reimbursement of transportation costs, excursions, and social events.
  - Wrote the conference website conferences.au.dk/aaf1, implementing responsive design.
- Directed a multi-year, self-driven project, decomposing complex objectives into structured milestones, and adapted the methodology with innovative solutions to **guarantee timely delivery and verifiable results**.
- Presented complex technical findings to expert and non-expert audiences, **adapting communication for diverse stakeholder groups**.
- Taught a master's math course (spring 2025), leveraging 9 years of teaching 60–100 undergraduate students/semester (4.5/5 mean rating).

Software Engineer, Open Source — **2014–**

- Contributed low-level terminal control functionality to **major projects used by millions worldwide**:
  - Authored 7 functions for the *os, termios, tty, and pty* modules of the **Python standard library** with comprehensive **unit tests** across **20 pull requests over 5+ years**, collaborating asynchronously with CPython core developers across **US/Europe time zones** via GitHub PRs and code reviews.
  - Implemented 2 **POSIX** terminal control functions for the **FreeBSD standard C library** with full **manual page documentation** following BSD conventions.
  - Improved *script(1)* and *scriptreplay(1)* utilities across **util-linux, FreeBSD, and NetBSD**, demonstrating **cross-platform** compatibility.
  - Published package *stty.py* to **PyPI** via automated **GitHub Actions CI/CD workflows**, achieving **100% test coverage** before release, for robust, Pythonic *stty(1)*-style terminal manipulation.
  - **Stack:** C, Python, POSIX/BSD/GNU termios and pseudoterminal APIs, Git, GNU Autotools, *nroff(1)*, GitHub Actions
- Developed research-grade **image processing** and **data analysis** tools using **deep learning** techniques:
  - Trained **GPU-accelerated, Euclidean and non-Euclidean geometry-aware Graph Neural Networks** (GNNs) and packaged as a **web app with a dashboard** providing interactive visualizations of graph embeddings.
  - Engineered **local deep learning text-to-image generation** pipeline, **optimizing inference performance**.
  - Built simple **time series forecasting system** for Danish electricity pricing, performed **quadratic programming-based optimization** for cost minimization.
  - **Stack:** PyTorch, NumPy, Matplotlib, pandas, PostgreSQL, TimescaleDB, CVXPY, Stable Diffusion, NVIDIA CUDA, cuDNN, Docker, Flask, Flask-SocketIO, HTML, CSS, JavaScript
- Designed **grammar, parser, and compilers for languages**, performed **lexical analysis, AST construction, semantic validation**, and vector graphics generation:
  - Crafted **EBNF (extended Backus-Naur form) grammar and parser** for LaTeX matrix and complex number expressions for the **official SymPy project**, wrote **150+ test cases** covering edge cases, plus GNU Emacs interface *compuTeX* for interactive development.
  - Architected *fretplot* LuaTeX package implementing **domain-specific language** for automatic plotting of guitar scale diagrams based on scale formulae. Published on **CTAN** and **GitHub** with parser and compiler for meta-language translation.
  - **Stack:** Python, SymPy, Lark, ANTLR 4, Lua, LaTeX, PGF/TikZ
- Adapted a **WebAssembly/Emscripten (Pyodide)**-based Python interpreter into a browser-based command-line (**xterm.js**) **computer algebra system** and developed a line editor interface.

EDUCATION

2019–2023
PhD, Mathematics
Texas A&M University
USA

2017–2019
MS, Mathematical Sciences
Clemson University
USA

MSc, Mathematics, 2014–2016
BSc, Math and Computer Science, 2011–2014
Chennai Mathematical Institute
India