David G. White, Ph.D.

Résumé

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Synopsis

Widely adept IT professional holding a Ph.D. in mathematics, seeking a role to integrate scientific expertise with proficiency in computing. Proven capable of learning advanced technical subjects through intense study. Developed software for a variety of purposes—from test harnesses for cryptographic algorithm implementations to web services driven by business rules engines. Comfortable with coding in a variety of general-purpose and domain-specific frameworks, administering Unix systems, conducting data analysis and research, etc.

Experience

2023-2025 **IT Security Consultant**, *atsec information security corp.*, Austin, TX

Performed and reported on code review and testing for validation of compliance to FIPS 140-3 requirements as part of the Cryptographic Module Validation Program (CMVP). Trained in NIST-approved security functions, such as AES/Rijndael, Keccak, RSA, ECDSA, and the post-quantum module-lattice-based algorithms. Individually developed software:

- Rust library integrating the driver of an HSM with an existing C-code test harness. (Built a Docker container in which to cross-compile this.)
- Python CLI client-side implementation of NIST's Automated Cryptographic Validation Protocol (ACVP). Handles SSL client certificates, TOTPs, JSON Web Tokens and paginated results.

Aug.-Dec. 2022 **Research Program Associate**, *Simons Laufer Mathematical Sciences Institute*, Berkeley, CA

Member of a collaborative research program on Floer homotopy theory. Participated in activities of the concurrent program on gauge theory.

2017-2023 **Graduate Research & Teaching Assistant**, *NC State Dept. of Mathematics*, Raleigh, NC

Instructor of record for courses in multivariable calculus and in topics from discrete mathematics. Administered distance-education courses in geometry, differential equations and linear algebra. Teaching assistant for several calculus courses.

2015–2016 **Associate Software Developer**, *iPipeline, Inc.*, Exton, PA

Front- and backend developer on an application computing projected values of actuarial financial products and writing the results to PDFs or webpages.

2011–2013 **Senior Developer & Systems Architect**, *BPM Specialists, Inc.*, Alpharetta, GA

Pega®-certified Senior Developer & Systems Architect. Worked on Java-based business process management (BPM) applications for clients including Wells Fargo and TSYS.

Education

2017–2023 **Ph.D.**, *North Carolina State University*, Raleigh, NC

Mathematics: dissertation on Floer theory in low-dimensional topology and knot theory, under the direction of Tye Lidman.

2016-2017 **Post-baccalaureate study**, *University of North Carolina at Charlotte*, Charlotte, NC

2007–2011 **B.A.**, *Duke University*, Durham, NC

Double major: mathematics & philosophy.

Service

2024 **Volunteer Teaching Assistant**, *Texas Prison Education Initiative (TPEI)*, Austin, TX, Courses taught at the TDCJ Coleman Unit, Lockhart, TX

Assisted delivery of credit-bearing UT Austin courses on precalculus and on mathematics in art to incarcerated students.

Jun. 2021 **LaTeX + Vim Workshop**, *NC State*, Raleigh, NC

Led a multi-session workshop, organized by the school AMS chapter, on writing LaTeX in Vim. Presentation slides and setup code can be found on the Resources page of my website.

COMPETENCIES

I have advanced expertise across a breadth of fields in mathematics and computing, from differential geometry to cryptography and Unix system administration. Having taught undergraduate mathematics and co-directed company training in cryptographic algorithms and validation processes, I have ample mentoring experience. I am seasoned in communicating my knowledge in speaking presentations and in technical writing.

Computing

Activities A few example of personal undertakings are:

- debugging numerical experiments running in MATLAB with integrated parallel Fortran routines;
- machine learning challenges on Kaggle;
- configuring the CLI email client Mutt to access IMAP email servers with OAuth;
- setting up versioned build toolchains for CUDA projects with Linux environment modules.

Languages C/C++, Rust, Java, Python, Javascript/Typescript, Perl, PHP, Lua, POSIX shell, SQL, Fortran, Haskell, VB, C#, TeX, PostScript, (System)Verilog

Development frameworks MATLAB, Maple, Mathematica, TensorFlow (w/ Keras), `scikit-learn`, PyTorch, CUDA, NumPy, SymPy, SciPy, pandas, SageMath, Macaulay2

Other tools & platforms GNU Make, CMake, Ninja, Git, Subversion, Cargo, `awk`, `sed`, `gdb` / `lldb`, dracut, `jq`, CUDA, Jupyter, Anaconda, Docker, SSH, Tmux/GNU Screen

Mathematics

Doctoral research Applications of Floer theory to low-dimensional topology and knot theory, drawing directly upon symplectic geometry and gauge theory. More broadly this entails study of

- algebraic topology,
- algebraic geometry,
- functional analysis,
- differential geometry,
- PDEs,
- category theory.

Other interests Current research in applied topology and numerical linear algebra, including in the areas of

- persistent homology,
- randomized sketching,
- mathematics of quantum computing.
- directed homotopy theory,
- fast direct solvers,

Languages

English — Native

French — Advanced — *Proficient reader; intermediate to advanced listening comprehension; developing speaker. Advanced undergraduate-level coursework (2019).*

German — Intermediate — *Intermediate-level reader; basic listening comprehension and speaking skills. Advanced undergraduate coursework (2007).*