

JEFFREY A. TURKSTRA

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PROFESSIONAL EXPERIENCE

Purdue University

Assistant Professor of Practice - Department of Computer Science

West Lafayette, IN

January 2017 - present

- Teach and manage two courses per semester
 - Software Engineering I, CS 30700, 3 credit hours, 166-185 students: Spring 2017, Fall 2017, Spring 2018
 - Systems Programming, CS 25200, 3 credit hours, 108 students: Spring 2018
 - Computer Architecture, CS 25000, 4 credit hours, 43 students: Summer 2017
 - Introduction to Systems for Information Security II, CS 50011, 2 students: Summer 2017
 - Problem Solving and Object-Oriented Programming, CS 18000, 4 credit hours, 185 students: Fall 2017
- Supervise 8-12 graduate teaching assistants (TAs) and 25-40 undergraduate TAs per semester
- Collaborate with fellow faculty in the advancement of computer science pedagogy
- IMPACT (Instruction Matters: Purdue Academic Course Transformation) Faculty Fellow: Fall 2017
 - Engaged in an intensive course redesign effort for CS 30700 - Software Engineering I
 - Developed new learning outcomes and objectives
 - Established plan to create flipped-format lectures covering git revision control software
 - Revised course structure to create a more student-centered, active learning-based environment
 - Developed an assessment plan to evaluate how course redesign influences student outcomes and learning
 - Implemented a new peer evaluation system using PHP and MariaDB that is now used by three courses: CS 30700, CS 40700, and CS 40800
- Feasting with Faculty program participant: Fall 2017
 - Shared lunch with 12-18 first-year students per week, increasing faculty contact outside of the classroom
- Engage in service activities for the university and larger community
 - Department representative for “Class Insights Dashboard” project, which aims to give faculty/instructors insights into the academic profile of students in their classes
- Conduct research in the field of operating and distributed systems
- Offer consulting services to industry

Software Engineer - Rosen Center for Advanced Computing

June 2009 - December 2016

- Developed virtualization middleware for large, distributed computational systems
 - Named “metachory,” source preview available at <https://metachory.org/preview/>
- Leveraged extensive knowledge of the Linux kernel, systems programming, and architecture including:
 - `ptrace()`-based process virtualization
 - Detailed knowledge of individual system call semantics including file and stream I/O, signals, memory management, and process management
 - Linux kernel implementations of data structures including linked lists, red-black trees, and hash tables
 - Distributed shared memory (DSM)-based coherence mechanisms
- Managed infrastructure and computing resources including machines, software, and databases associated with nanoHUB and the HUBzero project
 - Included RedHat and Debian-based systems, many running OpenVZ-patched kernels, on 150+ discrete hosts over 90 physical machines
 - Maintained and supported software stack including the following services: IPMI, Apache, cron, NFS, Exim4, Mailman, SpamAssassin, WebDAV, MySQL, PostgreSQL, ClamAV, Fail2ban, and iptables-based firewalls
 - Participated and contributed in security-hardening exercises for infrastructure and related hosts, including HIPAA-compliant systems
- Created and maintained a BASH-based failover script that utilizes ZFS snapshotting to provide rapid failover of critical systems
- Engineered FUSE filesystem driver to provide SFTP access to GIT repositories

Microfluidic Innovations, LLC*Engineer*

West Lafayette, IN

September 2009 - December 2011

- Designed a digital control system including multiple discrete computing elements
- Involved part selection and sampling, prototyping, schematic capture, and printed circuit board (PCB) layout
- Utilized tools including digital multimeter (DMM), oscilloscope, multi-counter, soldering iron, and software debuggers
- Gained working familiarity with PIC microcontroller assembly, BeagleBoard internals, I²C bus specification, and hardware considerations for devices with large inductive discharge
- Coded firmware and low-level API interfacing libraries in C and assembly language
- Fabricated entire prototype

Purdue University*Research Assistant - Network for Computational Nanotechnology*

West Lafayette, IN

January 2008 - May 2009

- Similar responsibilities to Purdue Software Engineer position above

*Instructor - School of Electrical and Computer Engineering**August 2005 - May 2008*

- Autonomously managed one (ECE 364) to four (ECE 264) lectures per week
- Responsible for creation of all course related material (homework assignments, quizzes, lectures, and exams)
- Supervised multiple graduate teaching assistants and undergraduate graders
- Operating Systems Engineering, ECE 469, 4 credit hours, 35 students: Spring 2008
- Software Engineering Tools, ECE 364, 1 credit hour, 30-55 students: Spring 2005, Fall 2006, Spring 2006, Spring 2007
- Advanced C Programming, ECE 264, 2 credit hours, 92 students: Fall 2005

*Research Assistant - Engineering Computer Network**August 2006 - December 2007*

- Assisted in the development and testing of storage area network (SAN)-related devices and firmware including: Sun StorEdge T3 Array, 3510, 3511, 3910, 6130, 6140, 6540, 6900, 6910, 6920, Brocade and QLogic switches, Sun Fire V40z, V440, V880, E10K Servers

*Research Assistant - Engineering Computer Network**August 2004 - August 2005*

- Managed various aspects of a joint grid computing project between Sun Microsystems and Purdue University
- Developed and implemented scripts enabling interoperability between ASIC design software and Sun's GridEngine
- Collected and analyzed hardware usage data to evaluate effectiveness of GridEngine and Sun Ray Server

*Peer Counselor - Division of Financial Aid**May 2002 - May 2004*

- Provided telephone support and face-to-face counseling for students and parents with financial aid questions and problems
- Utilized core academic systems including grades (registrar), financial aid, and billing (bursar)
- Assisted in training newly hired peer counselors

TECHNICAL STRENGTHS

Languages	C, C++, Python, Java, FORTRAN 90/95, PHP, SQL, Bash, KornShell, HTML, CSS, GW-BASIC, QBasic, and Visual Basic
Operating Systems	Fedora, RedHat Linux, CentOS, Debian, Ubuntu, Mint Linux, FreeBSD, SunOS, and Solaris
Daemons	Apache, BIND, OpenSSH, Samba, NFS, Sendmail, Exim, cron, MySQL, PostgreSQL, ClamAV, Fail2ban, iptables-based firewalls, as well as many other *nix daemons
Tools and Environments	git, Vim, CVS, RCS, CDE, KDE, Gnome, IPMI
Hardware Design	ABEL, VHDL, ModelSim SE Plus, Synopsys DC Shell, Silicon Ensemble, Cadence Virtuoso, PSpice, HSpice, Orcad Schematic and Capture, gEDA Software Suite
Clusters and Storage	Oracle Grid Engine, Sun Ray Server and Clients, Condor, StorEdge SAN Foundation, Common Array Manager (CAM), StorADE, Symantec Veritas Enterprise Administrator
Office	All versions of Microsoft Windows, Office, and DOS, L ^A T _E X, LibreOffice, and Peachtree Accounting

EDUCATION

Purdue University

West Lafayette, IN

Doctor of Philosophy (PhD)

May 2013

- Dissertation: *Metachory: An Unprivileged OS Kernel for General Purpose Distributed Computing*
 - Available at <https://metachory.org/metachory.pdf>
- Major Professor: Dr. David G. Meyer
- Coursework Highlights: Distributed Computer Systems, Information Security, Advanced Information Assurance, History and Philosophy of Engineering Education

Master of Science in Electrical and Computer Engineering (MSECE)

May 2007

- Coursework Highlights: Operating Systems, Computational Models and Methods, Computer Architecture, Parallel Computer Architecture, Advanced Computer Systems, Compilers, Solid State Devices
- Overall GPA: 3.5

Bachelor of Science in Computer Engineering (BSCmpE)

May 2004

- Coursework Highlights: Operating Systems, C Programming, ASIC Design (using VHDL), Computer Design & Prototyping, Microprocessor Systems & Interfacing
- Dean's List (2 Semesters) and Semester Honors (4 Semesters)
- Engineering Projects in Community Service (EPICS) Project Leader (August - December 2003)
- Overall GPA: 3.49

SERVICE

Purdue University

West Lafayette, IN

University Residences Faculty Fellow

August 2017 - present

- Work with floor resident assistant (RA) to help engage and integrate students with the university community
- Organize events for students (e.g., evening "dark site" astronomy excursion)
- Attend weekly floor dinners

IT Operational Oversight Committee

October 2015 - present

- Assist CIO in identifying and investigating ideas with potential to improve information technology on campus
- Author reports and surveys for subcommittees (e.g., investigation of solutions to "overwhelming" amounts of campus-originating email, network access policies for visitors, faculty/staff email outsourcing)

University Bands

2006 - present

- Videographer for 2006 - 2007 marching season onward
- Responsible for taping all overhead footage of the "All-American" Marching Band during home football games
- Develop and maintain <https://purdueband.com/> video archive, making over 900 historic videos available to students and faculty
- Assist in video editing and production of season DVD

Administrative & Professional Staff Advisory Committee (APSAC)

June 2015 - December 2016

- Represented over four hundred and fifty administrative and professional staff
- Served as a two-way conduit between A/P staff and the administration
- Assisted in development and distribution of monthly publication (the Sentinel)
- Maintained and improved organization's website
- Substitute representative on University Senate

Summer Undergraduate Research Fellowship (SURF) Mentor

Summer 2005

- Mentored multiple students in undergraduate research endeavors involving VLSI and related software
- Provided guidance and education, helping students to complete a variety of projects including an integrated circuit (IC) for room entry/exit detection

PUBLICATIONS AND AWARDS

Turkstra, J. A. (2013). "Metachory: An Unprivileged OS Kernel for General Purpose Distributed Computing." Doctoral dissertation, Purdue University. Major Professor: David G. Meyer. ProQuest Dissertations and Theses, 111. Retrieved from <https://metachory.org/metachory.pdf>. (1435641953).

Purdue University Charles C. Chappelle Fellow	2005 - 2006
Graduate Student Teaching Excellence Award	2005 - 2006
Magoon Award for Outstanding Teaching Assistant	2004 - 2005
Giles Morrill Memorial Scholarship Recipient	2002 - 2003

EXTRAPROFESSIONAL ACTIVITIES

Wabash Valley Astronomical Society

Member 2017 - present

- Promote astronomy among the local community through outreach efforts
- Volunteer at the West Lafayette Observatory
- Assist ASTR 263 teaching staff during evening observation events

Purdue Pilots, Inc. Flying Club

Member 2009 - present

- Obtained Private Pilot License (PPL), certificate number 3473175, on February 13, 2010

Amateur (HAM) Radio Operator

KC9ZNM - Technician Class 2013 - present

Purdue Ski & Snowboard Club

Member 2004 - 2007, 2014 - 2016

Purdue Skydiving Club

Member 2006 - 2008

Purdue University Bands

Various Positions 2000 - 2006

- Leadership positions included Section Leader and Assistant Section Leader
- Obtained top rank (colonel) as operations officer in the student officer corps
- Ensembles included Purdue "All-American" Marching Band, Basketball Pep Bands, and Concert Band

Unreal Internet Relay Chat Daemon (UnrealIRCd)

Head Coder 2001 - 2004

- Maintained the stable branch for an open source Linux daemon, making regular releases
- Responsible for patching newly discovered vulnerabilities
- Actively "back-ported" features from the current development version
- Involved extensive knowledge of the C programming language, CVS, and online bug reporting systems

Purdue Low Power VLSI Laboratory

Undergraduate Research Assistant August 2003 - December 2003

- Assisted in the development of low power SRAM cache
- Utilized Cadence Virtuoso to perform transistor-level design of clock subsystem, implemented as a ring oscillator
- Simulated and tested for errors with hSpice