Pradyumna Shome

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About

I am a rising senior majoring in **Computer Science** in the **Grainger College of Engineering** at the **University of Illinois at Urbana-Champaign**, with interests in **security, systems**, and **CS education**. On campus, I've been involved in research, teaching, and the student community. I currently work on security research at the **FPSG**, where I study microarchitectural side-channel attacks. I am a lead course assistant for **Illinois CS 241: System Programming**. In the past, I've helped organize **HackIllinois** and the **Reflections | Projections** technology conference. I've had industry experience through software engineering internships at **Facebook (*), Salesforce,** and **Virtusa**.

Education

University of Illinois at Urbana-Champaign — **Champaign-Urbana, IL, USA**
B.S. Computer Science, James Scholar — *August 2017–May 2021*

Relevant Classes:

Graduate / Upper Division:

- Computer Security I, II* (CS 461, CS 463)
- Distributed Systems* (CS 425)
- Machine Learning [PhD] (CS 446)
- Virtual Reality* (CS 498 VR)
- Combinatorics (CS 413)
- Senior Thesis* (CS 499)
- 2 x Independent Study (CS 397)

Undergraduate:

- System Programming (CS 241)
- Computer Architecture (CS 233)
- Algorithms and Models of Computation (CS 374)
- Numerical Methods (CS 357)

National Public School, HSR Layout — **Bangalore, KA, India**
High School Diploma, Science with Computer Science — *June 2013–May 2017*

Experience

Research

FPSG, Security and Privacy Research at Illinois — **Champaign-Urbana, IL, USA**
Research Assistant — *August 2019–Present*

- Advisor: Prof. Christopher W. Fletcher
- UIUC CS Research Experiences for Undergraduates (REU) Participant, Summer 2020
- Investigating the effects of dynamic overclocking and cache compression on memory access times
- Conducting extensive literature survey on vulnerabilities in hardware security topics
- Improve security by preventing data leakage on processors, through taint analysis, information flow tracking (IFT), and various branch predictor schemes
- Studying how modern computer architectural features such as speculative execution, multiple issue, and out of order execution make hardware increasingly prone to microarchitectural cache, timing, and contention-based side-channel attacks
- Learning to use tools such as the GEM5 simulator, Intel VTune for analyzing the program control flow, and static/dynamic code analyzers

Blender Lab, NLP Research at Illinois — **Champaign-Urbana, IL, USA**
Research Assistant — *August 2019–December 2019*

- Advisor: Prof. Heng Ji
- Conducting literature survey on event schema induction from multimedia, multilingual representations using graph neural nets, and one-shot learning
- Annotating videos for Yoga Robot; learning more about Attention Models and Transformers
- Participate in NLP Reading Group and Seminar - discussion of recent papers in the field of information extraction and natural language understanding

Professional

Facebook — **Seattle, WA, USA**
Incoming Software Engineering Intern — *September 2020–December 2020*

- Fall 2020

Salesforce — **San Francisco, CA, USA**
Software Engineering Intern, Records Experience | Platform Cloud — *June 2019–August 2019*

- Created web app to automatically suggest test plans for a new user story, through natural language processing of the acceptance criteria, using JavaScript (ES2017), Apex, SOQL, Web Components, and Jest for unit tests
- Reduced 13 engineering work days spent manually compiling test plans per sprint planning session
- Developed UI for Einstein Modeling's first Business Card Scanner, that uses OCR and Named Entity Recognition to automate the organization of business contact information.
- Ideated and built intern-matching social app using Python and Jinja, that helps bolster personal connections and surfaces common interests.

Virtusa — **New York, NY, USA**
Software Engineering Intern, Media & Content Division — *July 2018–August 2018*

- Created serverless cloud app and supporting data lake to model, process, and aggregate computer vision data for predictive analytics, using Python, AWS Lambda, Amazon API Gateway, and Amazon DynamoDB
- Implemented reference business intelligence (BI) tool, using NLP generative models (LDA, NTM) to gain insights on social media reactions to popular films and TV shows, using Boto 3, Amazon QuickSight, and Amazon SageMaker

HackIllinois — **Champaign-Urbana, IL, USA**
Systems Developer — *April 2018–February 2019*

- Developed Go microservices to enable user authentication, authorization, event registration, and notifications via mobile app clients, including CI / CD pipeline (Travis, AWS CodePipeline, Amazon ECS).
- Added features such as user mocking, OAuth single sign-on, multi-tier decision review, templated mail, error handling and CRUD (with MongoDB).
- Created QR code scanner in Android app to manage event check-in and track participant statistics for meals and mini-events.

Reflections | Projections **Champaign-Urbana, IL, USA**
Director, Web Team and Lead Web Developer *January 2018–September 2018*

- Principal full-stack developer of website written in ES6 using React, Webpack, and Nginx.
- Integrated microservices-based in-house registration API that brought in 2200+ applicants.
- Mentored junior developers through code review and pair programming.

Teaching

Stanford University **Stanford, CA, USA**
Section Leader, CS 106A: Programming Methodologies *April 2020–June 2020*

- Instructors: Prof. Chris Piech, Prof. Mehran Sahami
- Held weekly section teaching introductory Python to students, and answered student questions on online QA forum Ed
- Presented mini-lectures to re-iterate concepts, facilitated pair programming exercises for practice, and provided instruction in code decomposition and best practices in code style
- Discussed CS applications for people outside the tech industry, and potential next steps for deepening knowledge in the field

UIUC Department of Computer Science **Champaign-Urbana, IL, USA**
Lead Course Assistant, CS 241: System Programming *January 2019–Present*

- Instructor: Prof. Lawrence C. Angrave
- Recipient of Computer Science Outstanding Course Assistant Award
- Lead a lab section, conduct office hours, and develop assignments teaching concepts of Linux system programming
- Contribute content to and maintain course textbook and website, and conduct technical and behavioral interviews for prospective course staff members
- Manage course logistics, onboard and mentor new staff, and answer student questions on online Q&A platform
- Liaise with Prof. Lawrence Angrave to determine direction of course, and ensuring learning objectives are being met via assignments, homework and lab sections etc.
- Helping build a new class CS 240, for non-majors and CS+X majors, that combines our system programming and computer architecture classes

UIUC Department of Computer Science **Champaign-Urbana, IL, USA**
Course Assistant, CS 233: Computer Architecture *August 2018–December 2018*

- Instructor: Prof. Geoffrey L. Herman
- Hold a discussion section, and conduct office hours to help students learn concepts about computer architecture such as caches, instruction set architectures, (MIPS) assembly programming, instruction-level parallelism, vectorization etc.

Service

CS@Illinois SAIL **Urbana, IL, USA**
Teacher *March 2019*

- Prepared class on functional programming, and parser generators
- The class was about learning the roles and applications of (recursive descent) parsers, as well as learning to write a JSON parser in Haskell that generates a Java class, given boilerplate code such as a Backus-Naur Form (BNF) grammar

CS@Illinois SAIL **Urbana, IL, USA**

Volunteer *March 2018*

- Helped serve meals, and set up tables for a outreach event that exposes high-schoolers from nearby districts to various aspects of computer science through classes taught by college students

Ashwini Charitable Trust **Bangalore, KA, India**

Web Development Volunteer *May 2016-July 2016*

- Built mockups of proposed new website from scratch.
- Migrated website to Wordpress, to allow non-technical staff to create and update content.
- Incorporated search engine optimization to better target volunteers and potential donors.

Awards and Distinctions

- **2020**
  - Malwarebytes Cybersecurity Scholarship, Malwarebytes
  - Illinois Engineering Achievement Scholarship, UIUC College of Engineering
  - Outstanding Course Assistant Award, Department of Computer Science, UIUC
- **2019**
  - Kleiner Perkins Engineering Fellowship Finalist, Kleiner Perkins Caufield & Byers
  - Illinois Engineering Achievement Scholarship, UIUC College of Engineering
  - Forbes Under 30 Scholar, Forbes
- **2018**
  - Illinois Engineering Achievement Scholarship, UIUC College of Engineering
- **2017**
  - Edmund J. James Scholar Program, UIUC College of Engineering
  - AP Scholar with Distinction, College Board

Languages

English: Full professional proficiency

Hindi: Native or bilingual proficiency

French: Elementary proficiency

Technical skills

Programming Languages: Python, C, Java, Go, C++, Kotlin, HTML, CSS, JavaScript

Tools + Frameworks: Cloud (AWS, Firebase, Travis, Serverless, Docker); Databases (MongoDB, MySQL); Web (React, Node.js, Web Components); Version Control (Git, SVN)

Organizations

- Asian American Association (AAA) at UIUC
- Association for Computing Machinery (ACM) at UIUC
- NLP Reading Group at UIUC
- Security and Privacy Research at Illinois (SPRAI)
- Women in Computer Science (WCS) at UIUC

Hobbies & Interests

Table-tennis, board games, piano performance
Last updated: June 12th, 2020