Bharath Raj Namboothiry

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EDUCATION

Stanford University **Stanford, CA**
M.S. in Computer Science with Specialization in Theory | GPA: 4.00 *Class of 2024*
B.S. in Mathematics with Minor in South Asian Studies | GPA: 3.97

- **Relevant CS Courses:** Complexity Theory I/II, Machine Learning, Blockchain Technologies, Probabilistic Analysis, Advanced Topics in Cryptography, Computer and Network Security, Optimization and Algorithmic Paradigms, CS Core Classes
- **Relevant Math Courses:** Groups and Rings, Real Analysis, Complex Analysis, Probability Theory, Graph Theory, Number Theory
- **Programming Languages:** Rust, Python, C, C++, JavaScript, LaTeX
- **Extracurricular Leadership:** Residential Advisor (RA), Calculus Tutor, Stanford Bhangra Music Director, Blyth Fund Pitch Lead

PROFESSIONAL EXPERIENCE

Intel Labs **Santa Clara, CA**
Graduate Research Intern - Cryptography *Jan 2024 - Present*
- Collaborating on DARPA's HARDEN initiative to enhance the security of integrated computing systems via lightweight crypto.
- Furthering Cryptographic Capability Computing (C3), which optimizes vulnerable metadata with partially-encrypted pointers

Stanford Theory Group **Stanford, CA**
Researcher, Applied Cryptography Group *June 2021 – Present*
- Researched under the advisements of Profs. Dan Boneh, Li-Yang Tan, and Moses Charikar.
- Led 4 collaborative and independent research projects in zk-protocols, multi-party compute, graph theory and complexity theory.
- Submitted recent work to CT-RSA 2024 (pending acceptance decision).

Stanford School of Engineering **Stanford, CA**
Course Assistant *Sept 2022 – Dec 2023*
- Mentored and instructed a total of 1000+ students in cryptography, blockchain, and algorithms courses using C++, JS, and Solidity.
- Managed teams of 15+ staff to prepare, evaluate, and revise course material, homework, and exams.
- Collaborated with the CS Diversity, Equity, and Inclusion office to improve support resources for underrepresented students.

Intel Corporation **Hillsboro, OR**
Platforms and Systems Intern *June 2020 – Sept 2020*
- Led the thermal characterization of mobile PC platforms as an effort bottleneck problem, in collaboration with senior engineers.
- Automated a DOE system for thermal engineers using Python and FloScript, reducing experiment times from 2 days to 10 minutes.

Lighthaven Capital Management **San Francisco, CA**
SWE & Equity Research Intern *Jan 2020 – Sept 2020*
- Directed a team of university interns involved in fundamental stock research, in-depth equity evaluation and technical analysis.
- Built Python-based web tools that accelerated stock screening and instantly visualized Lighthaven's unique research pipeline.

RESEARCH EXPERIENCE AND PROJECTS

Proof of Fairness *July 2023 – Present*
- Working towards a proof of fairness, which reveals if a given model passes a pre-decided disparate impact threshold.
- Building a zero-knowledge layer around IBM Watson OpenScale, which is able to test fairness metrics post-hoc.

Revealable Functional Commitments (link) *June 2022 – June 2023*
- Developed new primitives to functional commitment schemes, enabling partial reveals of private committed functions.
- Expanded the state-of-art, allowing function privacy to be dynamically adjusted with zero-knowledge guarantees.

n-Party Private Function Commitments (link) *June 2022 – Aug 2022*
- Formulated a new class of multiparty computation problems, where collaborating parties hold secret portions of an joint algorithm.
- Engineered two zk functional commitment schemes for this class of problems, each with proofs of functional relation (PRFs).

Hardness of Picking a Winner *June 2021 – Sept 2021*
- Defined the algorithmic problem of 'picking a winner' on tournament graphs in various domain-specific distributions.
- Proved results on the complexity of identifying Slater winners and approximating Markov winners in random graphs.

Adaptive Predictive Sets with Class Conditional Coverage (link) *March 2021 – June 2021*
- Built a flexible, distribution-free method which can utilize any black-box classifier to output a predictive set of labels formally guaranteed to satisfy any user-specified class conditional coverage goal.
- Implemented algorithm in Python, and tested with classical ML classifiers and modern DNNs on MINST, CIFAR10, and ImageNet.

Classifly – Medical Drone Imaging (Hackathon) *February 2020*
- Developed a Swift-based computer vision application leveraging drone imagery to identify yellow fever cases in isolated terrains.
- Engineered and showcased real-time drone technology demonstration, successfully advancing through all judging rounds.
- Honored with the "Samsung Hack Award" at Stanford TreeHacks 2020 for outstanding innovation and application impact.