BINEET GHOSH

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RESEARCH INTERESTS

Broad interest lies in Design and Verification of Autonomous systems (Trustworthy Autonomy), which lies at the intersection of Formal Methods, Real-Time and Embedded Systems, Control Theory with applications in Robotics, Automotive, Industrial and Home Automation Systems.

EDUCATION

PhD	PhD, Computer Science University of North Carolina at Chapel Hill *(Transferred from UConn with research advisor)* Thesis: *Design and Verification of Autonomous Systems.*	Jan 2019 – Aug 2023 Aug 2017 – Jan 2019
M. Sc.	M. Sc., Computer Science Chennai Mathematical Institute	Jul 2014 – July 2016
B. Sc.	B. Sc., Computer Science (*Hons*) Ramakrishna Mission Vidyamandira **First Class First with Gold Medal**	Jul 2011 – May 2014

PROFESSIONAL EXPERIENCE

- **University of Alabama,** *Assistant Professor, Department of Computer Science* **AL, USA,** Aug 2023 – Present
- **UNC Chapel Hill and UConn,** *Graduate Research Assistant* **NC and CT, US,** Aug 2017 – June 2023
- **Tata Research,** *Research Intern* **Kolkata, India,** May 2019 – Aug 2019
- **Oracle,** *Software Developer* **Bangalore, India,** Jan 2016 – Jul 2017

HONORS AND AWARDS

- *Named a **Hewson Engineering Faculty Fellow**, The University of Alabama, College of Engineering (2024).*
- ***Best Presentation Award*** at the ***ACM SIGBED Student Research Competition*** (2022).
- ***Best Paper Candidate*** at ***IEEE RTCSA*** (2022).
- Selected for ***Eleventh Summer School on Formal Techniques*** (2022).
- ***Chateaubriand Fellowship 2021****. Offered by the Embassy of France in the United States.*
- ***3rd position in Oracle Retail Science Fair*** *2017.*
- ***Gold Medal.*** *May 2014. For securing first class first in B. Sc. Computer Science (Hons).*

SELECTED PUBLICATIONS

1. Hobbs, C., Xu. S., **Ghosh, B.**, Duggirala, P.S., Chakraborty, S. (2024). Quantitative Safety-Driven Co-Synthesis of Cyber-Physical System Implementations. *ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)*.
2. Hobbs, C., Xu, S., Song, Y., **Ghosh, B.**, Aktar, S., Yang, L., Sheng, Y., Jiang, W., Hu, J., Duggirala, P.S., Chakraborty, S. (2024). Poster/Demo: Neural Architecture Sizing for Autonomous Systems. *ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)*.
3. Xu. S., **Ghosh, B.**, Hobbs, C., Duggirala, P.S., Chakraborty, S. (2024). Certifiable and Efficient Autonomous Cyber-Physical Systems Design. *International Conference on VLSI Design (VLSID)*.
4. **Ghosh, B.**, Hobbs, C., Xu, S., Duggirala, P.S., Anderson, J., Thiagarajan, P. S., Chakraborty, S. (2024). Statistical Verification of Autonomous System Controllers Under Timing Uncertainties. *Real-Time Systems (TIME)*. [GitHub link to artifact]
5. **Ghosh, B.**, André, É. (2024). Offline and Online Energy-Efficient Monitoring of Scattered Uncertain Logs Using a Bounding Model. *Logical Methods in Computer Science (LMCS)*. [GitHub link to artifact].

6. Xu. S., **Ghosh, B.**, Hobbs, C., Thiagarajan, Fraccaroli, E., Duggirala, P.S., Chakraborty, S. (2023). Safety-aware Implementation of Control Tasks via Period Boosting and Compressing. *International Symposium on Automated Technology for Verification and Analysis (ATVA).*
7. Xu. S., **Ghosh, B.**, Hobbs, C., Thiagarajan, P. S., Chakraborty, S. (2023). Safety-aware Implementation of Control Tasks via Period Boosting and Compressing. *International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA).*
8. **Ghosh, B.**, André, É. (2023). MoULDyS: Monitoring of Autonomous Systems Under the Presence of Uncertainties. *Software Track of Science of Computer Programming.*
9. Xu. S., **Ghosh, B.**, Hobbs, C., Thiagarajan, P. S., Chakraborty, S. (2023). Safety-aware Flexible Schedule Synthesis for Cyber-Physical Systems using Weakly-Hard Constraints. 28th Asia and South Pacific Design Automation Conference (ASP-DAC).
10. **Ghosh, B.**, Hobbs, C., Xu, S., Duggirala, P.S., Anderson, J., Thiagarajan, P. S., Chakraborty, S. (2022). Quantitative Safety Verification of Autonomous Systems under Timing Uncertainties using Statistical Hypothesis Testing. *International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA).* **Best Paper Candidate.** Invited for an extension in Real-Time Systems journal. [GitHub link to artifact]
11. **Ghosh, B.**, André, É. (2022). Offline and Online Monitoring of Scattered Uncertain Logs Using Uncertain Linear Dynamical Systems. *International Conference on Formal Techniques for Distributed Objects, Components, and Systems (FORTE)*. Invited for an extension in LMCS journal. [GitHub link to artifact].
12. Hobbs, C., **Ghosh, B.**, Xu, S., Duggirala, P. S., Chakraborty, S. Safety Analysis of Embedded Controllers under Implementation Platform Timing Uncertainties. (2022). International Conference on Embedded Software (EMSOFT).
13. **Ghosh, B.**, Chinchali, S., Duggirala, P. S. (2021). Interpretable Trade-offs Between Robot Task Accuracy and Compute Efficiency. *International Conference on Intelligent Robots and Systems (IROS)*.
14. **Ghosh, B.**, Duggirala, P. S. (2019) Robust Reachable Set: Accounting for Uncertainties in Linear Dynamical Systems. *ACM ACM Trans. Embed. Comput. Syst*. [GitHub link to artifact].
15. **Full list of publications is available at** bineet.cs.ua.edu/pubs.html

TEACHING

- *Spring 2024:* [CS 691] **Trustworthy Autonomy.** [Syllabus] [Course webpage]
- *Fall 2024:* [CS 475/575] **Theory of Computation**. [Syllabus] [Course webpage]

ADDITIONAL EXPERIENCE

- Design and Automation Conference (DAC). *Ad-hoc*. 2024.
- ACM International Conference on Hybrid Systems: Computation and Control (HSCC). *Ad-hoc.* 2024. 2023.
- **NSF Panel. 2023.**
- International Conference on Robotics and Automation (ICRA). *Ad-hoc*. 2023.
- ACM Journal on Autonomous Transportation Systems. 2022.
- Journal Computing. 2022, 2021.
- ACM Transactions on Cyber-Physical Systems. 2022, 2021.
- International Conference on Embedded Software (EMSOFT). *Ad-hoc*. 2022, 2021.
- International Conference on Automation Science and Engineering (CASE). *Ad-hoc*. 2023, 2022.
- Fundamental Approaches to Software Engineering (FASE). *Ad-hoc*. 2022.
- Mathematical Foundations of Computer Science (MFCS). *Ad-hoc*. 2020.
- International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS). 2018.