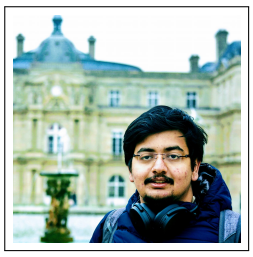
Ritam Raha



Personal Data

Place and Date of Birth:	Kolkata,West Bengal,India | 04 July 1996
Address:	Kaiserslautern, Germany
email:	ritam.raha18@gmail.com | rraha@mpi-sws.org
Current Occupation:	Postdoctoral Researcher in Computer Science Max Planck Institute for Software Systems
Highest Education:	Joint Ph.D. (cotutelle) in Computer Science University of Antwerp & LaBRI, University of Bordeaux

Research Interest

My research interest broadly includes Formal verification, Control theory, Artificial Intelligence, Formal methods and Automata theory. Specifically, my research vision is to apply formal methods and verification techniques to enhance the safety, security, and reliability of cyber-physical systems.

Employment

Current

2024- **Max Planck Institute for Software Systems**
Postdoctoral Researcher in Computer Science
Group: Control Software Systems Group led by Prof. Anne-Kathrin Schmuck
Research: Utilizing Formal Methods and Verification techniques to ensure safety control in cyber-physical systems

Education

Current

2019-2023 **University of Antwerp, Belgium & University of Bordeaux, France**
Ph.D. Student in Computer Science
Advisor: Guillermo A. Pérez & Nathanaël Fijalkow
Research Interest: Formal Methods and Verification, Artificial Intelligence, Logic and Automata Theory, Games

2017-2019 **Chennai Mathematical Institute, India**
M.Sc. in Computer Science
Advisor: Nicolas Markey & Loïc Hélouët
Thesis Title: Reachability Games With Strong AND Relaxed Energy Constraints

2014-2017 **Chennai Mathematical Institute, India**
B.Sc. in Mathematics & Computer Science

Publication

- (Journal) Scarlet: Scalable Anytime Algorithms for Learning Fragments of Linear Temporal Logic JOSS 2024
  Ritam Raha, Rajarshi Roy, Nathanaël Fijalkow, Daniel Neider
- (Conference) Synthesizing Efficiently Monitorable Formulas in Metric Temporal Logic VMCAI 2024
  R. Raha, R. Roy, N. Fijalkow, D. Neider, & G. Peréz
- (Conference) Parikh One-Counter Automata MFCS 2023
  M. Cadilhac, A. Ghosh, G. A. Pérez, & R. Raha
- (Conference) A Framework for the Competitive Analysis of Model Predictive Controllers RP 2023
  S. Bellis, J. Denil, R. Krishnamurthy, T. Leys, G. A. Pérez, & R. Raha
- (Conference) Scalable Anytime Algorithms for Learning Fragments of Linear Temporal Logic. TACAS 2022
  Ritam Raha, Rajarshi Roy, Nathanaël Fijalkow, Daniel Neider
- (Conference) Revisiting Parameter Synthesis for One-Counter Automata. CSL 2022
  Guillermo A. Pérez & Ritam Raha

- (Journal) Reachability Games with Relaxed Energy Constraints. Information and Computation
  Loïc Hélouët, Nicolas Markey & Ritam Raha
- (Conference) Reachability Games with Relaxed Energy Constraints. GandALF 2019
  Loïc Hélouët, Nicolas Markey & Ritam Raha

Tool

- TEAL (synThesizing Efficiently monitorAble mtL): a Python-based tool for synthesizing formulas in Metric Temporal Logic (MTL) for efficient Runtime monitoring. It is publicly available at GitHub.

- SCARLET (SCalable Anytime algoRithm for LEarning lTl): A tool for Learning LTL formulas from positive and negative traces, implemented in Python 3. It is publicly available at GitHub. It has also been accepted at the Journal of Open-Source Software (JOSS 2024).

Courseworks

CS Courses	Basic & Advanced Automata Theory, Design of Algorithms, Data Mining & Machine learning, Reinforcement Learning, Model Checking & System Verification, Complexity Theory, Logic - Automata & Games, Optimization Techniques, Concurrent Programming, Linear Programming and Convex Optimization
Programming Courses	Python, Java, Haskell, Applied Machine Learning
Mathematics Courses	Algebra I, II & III (Group, Rings, Vector Spaces, Fields), Calculus I, II & III, Topology, Differential Equations, Real & Complex Analysis

Internship Experience

Winter 2018	**Master's Intern at INRIA, Rennes** Worked under Prof. Nicolas Markey and Prof. Loic Helouet on "Reachability Games with Relaxed Energy Constraints"
Summer 2018	**Research Intern at LaBRI, Bordeaux** Worked under Prof. Nathanael Fijalkow, Vincent Penelle, Filip Mazowiecki and Nathan Lhote on "Weighted Automata with Ambiguity and Extensions"
Summer 2017	**Research Intern at LSV, ENS Cachan** Worked under Prof. Philippe Schnoebelen on "Piecewise Testable Index of Words and Its Algorithmic Evaluation"
Summer 2016	**Summer Intern at Institute of Mathematical Sciences, Chennai** Worked under Prof. Teodor Knapik, a visiting faculty at IMSc., from the University of Caledonia, on *"Automatic Structures and Presentations*" and also an official intern at TCS summer program by IMSc.

Talks

- Presented my work in several workshops and conferences. Some of the slides and video recordings are available in this link.
- Invited talk on Revisiting Parameter Synthesis for One-Counter Automata at Max Planck Institue for Software Systems, Germany.
- Invited talk on Weighted Automata (with Ambiguity and Extensions) at Formal Methods and Verification Seminar - Université libre de Bruxelles.
- Invited Talk on Software Verification via Logic for Bachelors and Masters students at University of Antwerp, Belgium.

Service

- Served as a Program Committee member in AAMAS 2024
- Reviewed several papers in peer-reviewed conferences and journals e.g., CSL, FORMATS, FSTTCS, IC, IPL

Teaching Experience

- Co-supervised Master's Thesis Internship for two Computer Science students in the University of Antwerp
- Worked as a Teaching-Assistant on "Concurrency Theory" course under Prof. Madhavan Mukund
- Worked as a Teaching-Assistant on "Mathematical Logic" course under Prof. M. Praveen
- Worked as a part-time teacher for VISTAMIND, Chennai

Scholarships and Certificates

October 2019	Recipient of Doctoral Scholarship Programme of University of Antwerp
December 2018	Selected winner in Poster Competition organised by *Tata Consultancy Services* for presenting "Synthesis via Multi-Criteria Quantitative Games".
FEB 2016	Recipient of INSPIRE scholarship programme

Programming Skills

Basic Knowledge:	Haskell, Java, HTML & CSS, C++
Advanced Knowledge:	Python, LaTeX

Extra-curricular

- Loves to play Ukulele
- Interested in sports (mainly Football)
- Loves recitation and participated at many cultural programmes in school and college

References

- **Guillermo Alberto Perez** *Head of the Formal Techniques in Software Engineering (FOTS) lab, a part of the AnSyMo research group.*

  Email Id: guillermoalberto.perez@uantwerpen.be
- **Nathanael Fijalkow** *full-time (permanent) researcher at CNRS in LaBRI, Bordeaux*

  Email Id: nathanael.fijalkow@labri.fr
- **Nicolas Markey** *CNRS senior researcher at IRISA*

  Email Id: nicolas.markey@irisa.fr
- **B. Srivathsan** *Professor, Chennai Mathematical Institute*

  Email Id: sri@cmi.ac.in
- **Madhavan Mukund** *Professor and Dean of Studies, Chennai Mathematical Institute*

  Email Id: madhavan@cmi.ac.in