

# YEHIA ABD ALRAHMAN

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## EDUCATION

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- 🎓 **Ph.D., Computer Science, IMT School for Advanced Studies** 2014– 2017  
*Thesis: A Foundational Theory for Attribute-based Communication* (**Total duration: 3 Years**)
- 🎓 **M.Sc., Computer Science, Philadelphia University** Feb. 2013  
*Thesis: A Denotational Semantics for the Language Cloud#*
- 🎓 **B.Sc., Computer Engineering, Philadelphia University** Feb. 2009  
*Thesis: Design and Implementation of a Real-Time Obstacles Avoidance Mobile Robot*

## WORK EXPERIENCE

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- Dept. Of Computer Science and Eng., University of Gothenburg** March 2021 -  
*Senior Research Fellow at the Swedish Research Council (also a permanent faculty at the University of Gothenburg)*  
I am the PI of **SYNTM: SYNTHESIS OF TeamWORK MULTI-AGENT SYSTEMS**. A starting grant from the Swedish Research Council. (Acceptance rate 14%), 4-million SEK. The purpose of SYNTM is to develop a foundational framework that will enable the automatic production of correct-by-design Teamwork Multi-Agent Systems from high-level descriptions of desired behaviour. The findings of SYNTM will comprise a significant development of current theories, that are still unable to handle this class of systems.
- Dept. Of Computer Science and Eng., Formal methods Div.** March 2019 - Feb 2021  
*Postdoctoral Researcher, University of Gothenburg, Gothenburg, Sweden*
- Dept. Of Computer Science and Eng., Formal methods Div.** Sept. 2018 - March 2019  
*Research Associate, University of Leicester, Leicester, UK*
- Dept. Of Computer Science and Eng., SysMA research unit** Feb. 2017 - Sept. 2018  
*Postdoctoral Researcher, IMT School for Advanced Studies, Lucca, Italy*

## RESEARCH APPOINTMENTS

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- Simons Institute for the Theory of Computing, University of California, Berkeley, US.** April 2021 - May 2021  
*Visiting Scholar (Virtual due to COVID-19)*
- Dept. Of Informatics, LFCS Laboratory** Jan. 2016 - June 2016  
*Visiting Researcher, University of Edinburgh, UK*
- Programming Languages & Verification Group** Sept. 2016 - Dec. 2016  
*Research Intern, Max Planck Institute for Software Systems, Germany*

## GRANT AND RESEARCH FUNDING

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- Principle investigator of **SYNTM: SYNTHESIS OF TeamWORK MULTI-AGENT SYSTEMS**, a starting grant from the Swedish Research Council. (**Acceptance rate 14%**), 4-million SEK (~ .5 m USD for 2021-2024).

## SCHOLARSHIPS

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- Scholarship from Max Planck Institute for Software Systems for 3-months Internship, Germany, Saarbrücken. 2016
- Scholarship of 50% increase from IMT for 6-months visiting period at the University of Edinburgh, UK. 2016
- Erasmus+ Traineeship scholarship for 6-months visiting period at the University of Edinburgh. UK. 2016
- Ph.D. in Computer Science Scholarship from IMT Institute for Advanced Studies, Italy, Lucca. 2013

## PUBLICATIONS

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A full list is available at [Google Scholar: Link](#)

### MOST IMPORTANT ARTICLES:

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- **Yehia Abd Alrahman**, Nir Piterman. Modelling and Verification of Reconfigurable Multi-Agent Systems. *Journal of Agents Multi Agent Syst.*, 35(2): 47. 2021( s10458-021-09521-x) (**The official journal on autonomous multi-agent systems**)
- **Yehia Abd Alrahman**, Braberman, V. A., D’Ippolito, N., Piterman, N., and Uchitel, S. Synthesis of Run-To-Completion Controllers for Discrete Event Systems, ACC 2021 - American Control Conference. (**A\* conference**)
- **Yehia Abd Alrahman**, Giuseppe Perelli, Nir Piterman. Reconfigurable Interaction for MAS Modelling. *19th International Conference on Autonomous Agents and Multiagent Systems, AAMAS 2020 May 9-13, 2020, Auckland, New Zealand* (available at: 1906.10793), 2020. (**A\* conference**). **This paper was selected as one of the premier papers for AAMAS 2020.**
- **Yehia Abd Alrahman**, Shaun Azzopardi, Nir Piterman.(2022). R-CHECK: A Model Checker for Verifying Reconfigurable MAS. 21th International Conference on Autonomous Agents and Multiagent Systems, AAMAS 2022 May 9-13, Auckland, New Zealand (**A\* conference**)
- **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti. A calculus for collective-adaptive systems and its behavioural theory. *Journal of Information and Computation* (available at: j.ic.2019.104457), 2019.
- **Yehia Abd Alrahman**, Giulio Garbi. A Distributed API for Coordinating AbC Programs. *International Journal on Software Tools for Technology Transfer* (available at: s10009-020-00553-4), 2020.
- **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti. Programming Interactions in Collective-Adaptive Systems by relying on Attribute-based Communication. *Science of Computer Programming Journal* (available at: j.scico.2020.102428), 2020.
- **Yehia Abd Alrahman**, Hugo Torres Vieira. A Coordination Protocol Language for Power Grid Operation Control. *Journal of Logical and Algebraic Methods in Programming* (available at: j.jlamp.2019.100487), 2019.

### CONFERENCE ARTICLES:

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- **Yehia Abd Alrahman**, Mauricio Martel, Nir Piterman.(2022). A PO Characterisation of Reconfiguration. 19th International Colloquium on Theoretical Aspects of Computing (ICTAC) Sept. 27-29, 2022, Tbilisi, Georgia
- **Yehia Abd Alrahman**, Shaun Azzopardi, Nir Piterman.(2022). Model-Checking Reconfigurable Interacting Systems. Leveraging Applications of Formal Methods, Verification and Validation - 11th International Symposium on Leveraging Applications of Formal Methods, ISoLA 2022, Rhodes, Greece, October 26-29, 2022
- **Yehia Abd Alrahman**, Claudio Antares Mezzina, Hugo Torres Vieira. Testing for Coordination Fidelity. In Boreale M. et al. (eds) *Models, Languages, and Tools for Concurrent and Distributed Programming*. Lecture Notes in Computer Science, vol 11665. Springer, Cham (pp. 1–20). DOI: 10.1007/978-3-030-21485-2\_10, 2019.

- **Yehia Abd Alrahman**, Rocco De Nicola, Giulio Garbi. Goat: Attribute-based Interaction in Google Go. ISOLA2018. In T. Margaria & B. Steffen (Eds.), 8th International Symposium, ISoLA 2018, Cyprus, October 2018 (pp. 1–16). DOI: 10.1007/978-3-030-03424-5\_19, 2018.
- **Yehia Abd Alrahman**, Rocco De Nicola, Giulio Garbi, Michele Loreti. A Distributed Communication Infrastructure for Attribute-based Interaction. In C. Baier & L. Caires (Eds.). Formal Techniques for Distributed Objects, Components, and Systems - 38th IFIP WG 6.1 International Conference, FORTE 2018, Madrid, Spain, June 18-21, 2018, Proceedings (pp. 1–20). DOI: 10.1007/978-3-319-92612-4\_1, 2018.
- **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti. On the Power of Attribute-Based Communication. In T. Margaria & B. Steffen (Eds.), Formal Techniques for Distributed Objects, Components, and Systems - 36th IFIP WG 6.1 International Conference, FORTE 2016, Heraklion, Crete, Greece, June 6-9, 2016, Proceedings (pp. 1–18). DOI: 10.1007/978-3-319-39570-8\_1, 2016.
- **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti. Programming of CAS Systems by Relying on Attribute-Based Communication. In T. Margaria & B. Steffen (Eds.), 7th International Symposium, ISoLA 2016 Imperial, Corfu, Greece, October 10–14, 2016 Proceedings, Part I (pp. 539–553). DOI: 10.1007/978-3-319-47166-2\_38, 2016.
- **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti, Francesco Tiezzi, Roberto Vigo. A Calculus for Attribute-based Communication. SAC '15 Proceedings of the 30th Annual ACM Symposium on Applied Computing (pp. 1840–1845). DOI: 10.1145/2695664.2695668, 2015.
- **Yehia Abd Alrahman**, Marina Andric, Alessandro Beggiato, Alberto Lluch-Lafuente. Can We Efficiently Check Concurrent Programs Under Relaxed Memory Models in Maude?. Santiago Escobar (Ed.), 10th International Workshop, WRLA 2014 Held as a Satellite Event of ETAPS Grenoble, France, April, 2014. DOI: 10.1007/978-3-319-12904-4\_2, 2014.

## TALKS

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- A PO Characterisation of Reconfiguration, 19th International Colloquium on Theoretical Aspects of Computing (ICTAC 2022), Tbilisi, Georgia, 2022.
- Synthesis and Control of Autonomous Systems, Invited Talk for RSE'22 - Robotics & Software Engineering, GSSI-Gran Sasso Science Institute, L'Aquila, Italy 2022.
- Computational Logic and Controller Synthesis, Guest Lecture for Logic in Computer Science, Chalmers University of Technology, Gothenburg, Sweden 2021
- Reconfigurable Interaction for MAS Modelling, Highlights 2020, Aachen, Germany, 2020. Poster Here!
- Reconfigurable Interaction for MAS Modelling, AAMAS 2020, Auckland, New Zealand, 2020. Watch Here!.
- A Calculus for Attribute-based Communication, CINA meeting, Turin, Italy, 2015.
- A Calculus for Attribute-based Communication, SAC'15, Salamanca, Spain, 2015.
- On Expressiveness and Behavioural Theory of Attribute-based Communication, QUANTICOL, Lucca, Italy, 2015.
- On the Expressiveness of Attribute-based Communication, PEPA CLUB, Edinburgh, UK, 2016.
- On the Power of Attribute-based Communication, FORTE'16, Heraklion, Greece, 2016.
- A Distributed Coordination Infrastructure for Attribute-based Communication, QUANTICOL, Pisa, Italy, 2017.
- A Theoretical Framework for Collective-Adaptive Systems, Camerino, Italy, January 2018.
- A Distributed Communication Infrastructure for Attribute-based Interaction, FORTE'18, Madrid, Spain, 2018.
- A Computational Framework for Adaptive Systems and its Verification, Bernoulli Institute, Netherlands, 2019.

## PROFESSIONAL ACTIVITIES

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- Elsevier Journal of Theoretical Computer Science: Reviewer, TCS 2022.
- Springer International Journal on Software Tools for Technology Transfer: Reviewer, STTT 2019.
- Elsevier Journal of Logical and Algebraic Methods in Programming: Reviewer, JLAMP 2018.
- ACM Transactions on Modelling and Computer Simulation Journal: Reviewer, Special Issues for FORECAST 2017 and QEST 2018.
- Reviewer: TACAS2023, CAV2022, eCAS2022 and 2021(PC), Discoli2022 (PC), CDC2021, ICTAC2021, Concur2020, LPAR 2020, WRLA 2020, SEFM 2019, SEFM 2018, MFCS17, TTCS 2017, TASE 2017, COORDINATION 2016 and 2017, FACS 2014 and 2017, FoCAS@SASO14, and WRLA 2014.

## PEDAGOGIC TRAINING (14 WEEKS)

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- Teaching and Learning in Higher Education 1: Basic Course (PIL101) 3.5v (Completed June 2021).
- Teaching and Learning in Higher Education 2: Subject Field Pedagogy (PIL102) 3.5v (Completed Dec 2022).
- Supervision in Postgraduate Programmes (PIL201) 3.5v (Completed Dec 2022).
- Teaching and Learning in Higher Education 3: Applied Analysis (PIL103) 3.5v (Finishes in June 2023).

## TEACHING RESPONSIBILITIES

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- Course main teacher and responsible: TDA567 / DIT083 Testing, Debugging and Verification (7.5 hp, 1st Cycle, English, 60 Students), [Link](#)
- Co-Teacher of DAT425/DAT505 Introductory course in programming (7 hp, 1st Cycle, English, 218 Students) (Sept-Dec 2021).

## PHD CO-SUPERVISION

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2017-2018	Giulio Garbi, P.h.D Student	IMT School for Advanced Studies, Italy
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## MASTER STUDENTS

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- **Thesis:** Semi-Supervised Federated Learning for Audio Recognition of Road-Type (Graduation June 2022)  
**Industrial Partner:** WirelessCar  
Adam Davidsson, Master Student, Chalmers University, Sweden  
Simon Larsson, Master Student, Chalmers University, Sweden
- **Thesis:** Formal Verification of a Distributed System for Classifying Asymmetric Internet Traffic (Started Dec 2022)  
**Industrial Partner:** Sandvine  
Frans Bergman, Master Student, Chalmers University, Sweden  
Shubhankar Choudhari, Master Student, Chalmers University, Sweden

## SOFTWARE TOOLS

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Open source code from my work can be found on Github:

- R-CHECK: A model checker to verify reconfigurable distributed systems. [Link](#)
- $Ab^aCuS$ : A run-time environment for attribute-based interaction in Java. [Link](#)
- *AbC* Simulator: Performance Evaluation of attribute-based communication infrastructures. [Link](#)
- *GoAt*: Attribute-based interaction in Google Go. [Link](#)
- The *GoAt* plugin: An Eclipse plugin for the *AbC* calculus. [Link](#)

## SPOKEN LANGUAGES

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English (fluent); Swedish, Italian (basic).

## REFERENCES

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**Prof. Nir Piterman.** University of Gothenburg, Sweden. Email: [piterman@chalmers.se](mailto:piterman@chalmers.se)

**Prof. Gerardo Schneider.** University of Gothenburg, Sweden. Email: [gerardo@cse.gu.se](mailto:gerardo@cse.gu.se)

## THESIS EXAMINERS

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**Prof. Gul Agha.** University of Illinois at Urbana-Champaign Email: [agha@illinois.edu](mailto:agha@illinois.edu)

**Prof. Luca Aceto.** Reykjavik University, Iceland Email: [luca.aceto@ru.is](mailto:luca.aceto@ru.is)