

Dr. Yehia Abd Alrahman

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1. WORK EXPERIENCE

Associate Professor (Docent) in Computer Science & Senior Lecturer starting Mar 2024

Dept. Of Computer Science and Engineering, Chalmers | University of Gothenburg

Nov 2023 — present
Gothenburg, Sweden (SE)

Senior Research Fellow

Dept. Of Computer Science and Engineering, Formal methods, Chalmers | University of Gothenburg

Mar 2021 — Feb 2024
Gothenburg, Sweden (SE)

Postdoctoral Researcher

Dept. Of Computer Science and Engineering, Formal methods, Chalmers | University of Gothenburg

Mar 2019 — Feb 2021
Gothenburg, Sweden (SE)

Research Associate

Dept. Of Computer Science and Engineering, University of Leicester

Sep 2018 — Mar 2019
Leicester, United Kingdom (UK)

Postdoctoral Researcher

Dept. Of Computer Science and Engineering, IMT Institute for Advanced Studies

Jun 2017 — Aug 2018
Lucca, Italy (IT)

2. RESEARCH VISITS/INTERNS

Visiting Scholar (Virtual due to COVID-19)

Simons Institute for the Theory of Computing, University of California, Berkeley

Apr 2021 — May 2021
California, United States (US)

Research Intern

Programming Languages & Verification Group, Max Planck Institute for Software Systems

Sep 2016 — Dec 2016
Saarbrücken, Germany (DE)

Visiting Researcher

Dept. Of Informatics, LFCS Laboratory, University of Edinburgh

Jan 2016 — Jun 2016
Edinburgh, United Kingdom (UK)

3. EDUCATION

Ph.D in Computer Science (Rating: Excellent)

Dept. Of Computer Science and Engineering, IMT Institute for Advanced Studies

29th May, 2017
Lucca, Italy (IT)

- **Thesis:** "A Foundational Theory for Attribute-based Communication"
- **Supervisor:** Prof. Rocco De Nicola

MSc. in Computer Science (Rating: Excellent)

Dept. Of Computer Science, Philadelphia University

2013
Amman, Jordan (JO)

- **Thesis:** "A Denotational Semantics for the Language Cloud#"
- **Supervisor:** Dr. Mourad Maouche

BSc. in Computer Engineering (Rating: Excellent)

Dept. Of Electrical and Computer Engineering, Philadelphia University

- **Thesis:** “Design and Implementation of a Real-Time Obstacles Avoidance Mobile Robot”
- **Supervisor:** Dr. Kasim Al-Aubidy

2009

Amman, Jordan (JO)

4. DEDUCTIBLE TIME

The Phd program in Italy is 3-Year long, and thus my career is comparable to those with a 5-Year Phd completed in 2019.

5. RESEARCH GRANTS

VR Starting Grant

Swedish Research Council (Vetenskapsrådet)

Jan 2021—Dec 2024

Sweden (SE)

- **Title:** “**SYNTM: SYNTHESIS OF TeamWORK** MULTI-AGENT SYSTEMS”
- **Role:** Principal investigator (PI)
- **Total Budget:** 4000,000 SEK (~400,000 USD)
- **Project-ID (Link):** [2020-03401_VR](#)
- **Acceptance rate:** 14% for starting grants in 2020 ([Link](#)).

6. SUPERVISION EXPERIENCE

Postdoc Level (Co-Supervision)

Dept. Of Computer Science and Engineering, Chalmers | University of Gothenburg

Gothenburg, Sweden (SE)

- **Number:** 3
- **Project:** Reconfigurable Multi-Agent Systems
- **Postdocs:** Dr. Shaun Azzopardi (2020—2023), Dr. Mauricio Martel (2020—2022), Dr. Luca Di Stefano (2022—Present)
- **Co-Supervision with:** Prof. Nir Piterman (See A. 1, B. 1, B. 2, B. 3 In Publication List 12.)

Ph.D Level (Co-Supervision)

Dept. Of Computer Science and Engineering, IMT Institute for Advanced Studies

Lucca, Italy (IT)

- **Number:** 1
- **Thesis:** “Correct Implementation of Attribute-based Communication in Google Go”
- **Student:** Giulio Garbi
- **Co-Supervision with:** Prof. Rocco De Nicola (Only for years 2018—2019, See A. 3, B. 6, B. 7 In Publication List 12.)

MSc. Level (Main Supervisor)

Dept. Of Computer Science and Engineering, Chalmers | University of Gothenburg

Gothenburg, Sweden (SE)

Number: (7) students, (4) theses

(1) **Thesis:** “Physical Space Modelling in Reconfigurable Interacting System”, 2024

- **Student:** Tom de Ridder
- **Proposal:** Based on my research

(2) **Thesis:** “Graph algorithms to determine sufficient connectivity of collaborative autonomous systems”, 2024

- **Students:** Edvin Alestig, Max Hvid-Hansen
- **Proposal:** Based on my research

(3) **Thesis:** “Formal Verification of FlowSync”, June 2023 ([Link](#))

- **Students:** Frans Bergman, Shubhankar Choudhari
- **Industrial Partner:** Sandvine

(4) **Thesis:** “Semi-Supervised Federated Learning for Audio Recognition of Road-Type”, June 2022 ([Link](#))

- **Students:** Adam Davidsson and Simon Larsson
- **Industrial Partner:** WirelessCar

BSc. Level (Main Supervisor)

Dept. Of Computer Science and Engineering, Chalmers | University of Gothenburg

Gothenburg, Sweden (SE)

- **Number:** (6) students, (1) thesis
- **Thesis:** “RECS: A Concurrent Cache-Efficient Entity Component System” (Defended May 2023)
- **Students:** Martin Jonsson, Mathias Prétot, Jacob Bredin, Christoffer Persson, Linn Österlund, Edvin Nilsson

7. TEACHING EXPERIENCE

BSc. Level

Dept. Of Computer Science and Engineering, Chalmers | University of Gothenburg

Gothenburg, Sweden (SE)

Number: (2) courses, (1) main responsible

(1) Course: “TDA567 / DIT084 Testing, debugging and verification” (7.5 hp)

- **Role:** Teacher & Main Responsible (3 TA students work with me)
- **No of Students:** around 70
- **Time:** Every year (Oct—Jan)
- **My recent course content updates:** [Link](#)

(2) Course: “DAT425/DAT505 Introductory course in programming” (7.5 hp)

- **Role:** Co-Teacher + TA
- **No of Students:** around 218
- **Time:** Year 2021 (Sept—Dec)

Note: in my current department, the usual teaching load for researchers is 25%. This is equivalent to take responsibility for a 7.5 hp course. Moreover, teaching different courses each year is not the tradition in our department, and that is why I am only responsible for TDA567 / DIT084.

8. PEDAGOGIC TRAINING

Pedagogical Development and Interactive Learning (PIL), University of Gothenburg

Gothenburg, Sweden (SE)

Number: (4) courses, (14) Weeks

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

9. FUNCTIONS AND COMMISSIONS OF TRUST

Internal Examination & Recruitment Committees

- **Examiner:** Total: 4 Master theses (1 for 2023 and 3 for 2024).
- **FM Retreat Workshop at Säröhus:** Organizer Jan 2023
- **Phd Recruitment Committee:** (C = Chair , M = Member, S=Potential Supervisor) Oct 2023
 - (1) Committee: Nir Piterman (C), Christian Berger (M), Morteza Haghir Chehreghani (M), Yehia Abd Alrahman (S)
 - * **Phd Recruitment Committee:** (C = Chair , M = Member)
 - * Project: Space-Aware Synthesis of Autonomous Systems.
 - (2) Committee: Nir Piterman (C), Magnus Myreen (M), Yehia Abd Alrahman (M) Oct 2021
 - * Recruited students: David Lidell & Prabhat Jha
- **Postdoc Recruitment Committee:**(C = Chair , M = Member) Mar 2020

- * Committee: Nir Piterman (C), Gerardo Schneider (M), Wolfgang Ahrendt (M), Yehia Abd Alrahman (M)
- * Recruited postdocs: Shaun Azzopardi & Mauricio Martel

External Reviews & Appointments

– Journal Reviews:

- * IEEE Transactions on Automatic Control (TAC) 2023, 2024.
- * Elsevier Journal of Theoretical Computer Science (TCS) 2022.
- * Springer International Journal on Software Tools for Technology Transfer (STTT) 2019.
- * Elsevier Journal of Logical and Algebraic Methods in Programming (JLAMP) 2018.
- * ACM Transactions on Modelling and Computer Simulation (TOMACS): Special Issues for FORECAST 2017 & QEST 2018.

– Conference Reviews:

- * CSL2024, iFM2023, TACAS2023, CAV2022, CDC2021, CDC2022, CDC2023, 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.

– Program Committee:

- * Workshop on Engineering Collective Adaptive Systems (eCAS) From 2021.
- * Workshop on Distributed Collective Intelligence (Discoli) From 2022.

10. INVITED LECTURE/CONFERENCE TALKS

Invited Talks/Lectures

- 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[Here!](#).
- SynTM: Synthesis of Teamwork Multi-Agent Systems, Invited Talk for KTH Division of Decision and Control Systems, Sweden, Stockholm, 2021.
- A Computational Framework for Adaptive Systems and its Verification, Invited Talk for Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, Groningen, Netherlands, 2019 [Here!](#).
- A Theoretical Framework for Collective-Adaptive Systems, Invited Talk for University of Camerino, Italy, January 2018.
- A Distributed Coordination Infrastructure for Attribute-based Communication, Invited Talk for EU QUANTICOL project, Pisa, Italy, 2017.
- On the Expressiveness of Attribute-based Communication, Invited Talk for PEPA CLUB, Edinburgh, UK, 2016.
- A Calculus for Attribute-based Communication, Invited Talk for CINA project meeting, Turin, Italy, 2015.
- On Expressiveness and Behavioural Theory of Attribute-based Communication, Invited Talk for EU QUANTICOL project, Lucca, Italy, 2015.

Selected Conference Talks

- A PO Characterisation of Reconfiguration, 19th International Colloquium on Theoretical Aspects of Computing (ICTAC 2022), Tbilisi, Georgia, 2022.
- Synthesis of Run-To-Completion Controllers for Discrete Event Systems, American Control Conference ACC 2021, New Orleans, LA, USA.

- 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!](#).

11. SCHOLARSHIPS

• Funding 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
• M.Sc. in Computer Science Scholarship from Philadelphia University, Amman, Jordan.	2010
• B.Sc. in Computer Engineering Scholarship from Philadelphia University, Amman, Jordan.	2004

12. PUBLICATION LIST

- Scopus FWCI (Field Weighted Citation Impact): 1.57 [Link](#)
- Five of Most Important Articles are marked with (*).
- Articles co-authored with a student are marked with (s).

I selected a list of 5 important scientific papers (marked with *) to support this application. The selection is based on the importance of their scientific contributions, and also my leadership and team management role. I recall that in my area of Computer Science conference publications are fully peer-refereed, many publications are never archived in a journal, and a publication in a high-ranked conference is much more prestigious than publication in most journals. In particular, all papers below were peer-reviewed. All highlighted papers (except A. 6) are not co-authored with my PhD supervisor (Links are available)

A. Peer-reviewed original articles (Journals):

1. **Yehia Abd Alrahman**, Shaun Azzopardi, Luca De Stefano, Nir Piterman (2023). Language Support for Verifying Reconfigurable Interacting Systems. *International Journal on Software Tools for Technology Transfer* (Available at: [s10009-023-00729-8](#))
2. * **Yehia Abd Alrahman**, Nir Piterman (2021). Modelling and Verification of Reconfigurable Multi-Agent Systems. *Journal of Autonomous Agents and Multi-Agent Systems*, 35(2): 47. (Available at: [s10458-021-09521-x](#)) (The official leading journal of the International Foundation for Autonomous Agents and Multi-Agent Syst.) **[Best Paper Special Invite]**
- 3.^s **Yehia Abd Alrahman**, Giulio Garbi (2020). A Distributed API for Coordinating AbC Programs . *International Journal on Software Tools for Technology Transfer*. (Available at: [s10009-020-00553-4](#)).
4. **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti (2020). Programming Interactions in Collective-Adaptive Systems by relying on Attribute-based Communication. *Science of Computer Programing Journal*. (Available at: [j.scico.2020.102428](#)).
5. **Yehia Abd Alrahman**, Hugo Torres Vieira (2019). A Coordination Protocol Language for Power Grid Operation Control. *Journal of Logical and Algebraic Methods in Programming* . (Available at: [j.jlamp.2019.100487](#)).
- 6.* **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti (2019). A calculus for collective-adaptive systems and its behavioural theory. *Journal of Information and Computation*. (Available at: [j.ic.2019.104457](#)).

B. Peer-reviewed conference contributions:

- 1.* **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, 2022, Auckland, New Zealand. (Available at: [2201.06312](#)) [*AAMAS is the largest and most influential conference in the area of agents and multiagent systems*] (*A* conference*)
2. **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 (Available at: [85140773075](#))
3. **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, Rhodes, Greece, October 26-29, 2022 (Available at: [2-s2.0-85142688653](#))
- 4.* **Yehia Abd Alrahman**, Braberman, V. A., D'Ippolito, N., Piterman, N., and Uchitel, S (2021). Synthesis of Run-To-Completion Controllers for Discrete Event Systems. ACC 2021 - American Control Conference. (Available at: [2-s2.0-85111901485](#)) . *ACC is the flagship conference of the American Automatic Control Council (AACC)* (*A* conference*)
- 5.* **Yehia Abd Alrahman**, Giuseppe Perelli, Nir Piterman (2020). 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. *AAMAS is the largest and most influential conference in the area of agents and multiagent systems* [*Selected as one of the best papers for AAMAS 2020*] (*A* conference*)
- 6.^s **Yehia Abd Alrahman**, Rocco De Nicola, Giulio Garbi (2018). Goat: Attribute-based Interaction in Google Go. In T. Margaria & B. Steffen (Eds.), 8th International Symposium, ISO LA 2018, Cyprus, October 2018 (pp. 1–16), 2018. (Available at: [2-s2.0-85081229073](#))
- 7.^s **Yehia Abd Alrahman**, Rocco De Nicola, Giulio Garbi, Michele Loreti (2018). 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), 2018. (Available at: [2-s2.0-85048240060](#))
8. **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti (2016). 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), 2016. (Available at: [2-s2.0-84977599122](#))
9. **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti (2016). Programming of CAS Systems by Relying on Attribute-Based Communication. In T. Margaria & B. Steffen (Eds.), 7th International Symposium, Imperial, Corfu, Greece, October 10–14, 2016 Proceedings, Part I (pp. 539–553), 2016. (Available at: [2-s2.0-84993990135](#))
10. **Yehia Abd Alrahman**, Rocco De Nicola, Michele Loreti, Francesco Tiezzi, Roberto Vigo (2015). A Calculus for Attribute-based Communication. Proceedings of the 30th Annual ACM Symposium on Applied Computing (pp. 1840–1845), 2015. (Available at: [2-s2.0-84943609297](#))

C. Peer-reviewed workshop contributions:

1. **Yehia Abd Alrahman**, Marina Andric, Alessandro Beggiato, Alberto Lluch-Lafuente (2014). 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, 2014. (Available at: [2-s2.0-84911973711](#))

D. Peer-reviewed book chapters:

1. **Yehia Abd Alrahman**, Claudio Antares Mezzina, Hugo Torres Vieira (2019). 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), 2019. (Available at: [2-s2.0-85068862489](#))

E. Course-reviewed pedagogic contributions (Not Published):

1. **Yehia Abd Alrahman** (2023). Theoretical Computer Science for Diverse-Skilled Students. In PIL103 Applied Analysis. (Available at: [10.1007/978-3-030-21485-2_10](#)).

F. Technical Reports:

1. **Yehia Abd Alrahman**, Nir Piterman (2023). Correct-by-Design Teamwork Plans for Multi-Agent Systems (Available at: s10458-021-09521-x).

13. SOFTWARE TOOLS

Open source code based on my research can be found on Github:

1. SYNTM: A synthesis engine for Teamwork Multi-Agent Systems. [Link](#)
2. R-CHECK: A model checker for verifying reconfigurable distributed systems. [Link](#)
3. RTC Control in Modal Transition System Analyser (MTSA). [Link](#) [the rtc branch]
4. Ab^aCuS : A run-time environment for attribute-based interaction in Java. [Link](#)
5. AbC Simulator: Performance Evaluation of attribute-based communication infrastructures. [Link](#)
6. $GoAt$: Attribute-based interaction in Google Go. [Link](#)

14. LEADERSHIP TRAINING

Leader Development (Ledarutbildning), University of Gothenburg

Gothenburg, Sweden (SE)

Number: (1) courses, workshops(1)

- Communication and Feedback (Completed on 29th May 2023)
 - One-To-One Communication and Information Sharing across levels.
 - Behavioural and Performance Feedback.
 - Models of Constructive Feedback.
- The 3rd IT Faculty workshop in Gender equality and equal treatment in doctoral studies (27 October 2023).

15. PHD THESIS EXAMINERS & SUPERVISOR

Examiner: Prof. Gul Agha, University of Illinois at Urbana-Champaign, US, Email: agha@illinois.edu

(ACM Fellow)

Examiner: Prof. Luca Aceto, Reykjavik University, Iceland, Email: luca.aceto@ru.is

(Member of Academia Europaea)

Supervisor: Prof. Rocco De Nicola, IMT Institute, Italy, Email: rocco.denicola@imtlucca.it

(Member of Academia Europaea)