Manolis Chiou

Research Fellow in Robotics
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Research Profile

I aim to achieve effective and fluent Human-Robot Teaming using the complementing competencies of robot AI and humans. My research is cross-disciplinary, drawing on methods from AI, robotics, human factors, and cognitive science. I emphasise application-driven research on HRT and HRI via variable autonomy paradigms where humans collaborate with intelligent robots capable of dynamically self-regulating their level of autonomy.

Keywords: Human-Robot Teaming, Human-Robot Interaction, Variable Autonomy, Mixed-Initiative, Shared Autonomy, robotics in hazardous environments

Employment

Research Fellow (Senior Postdoc) 2020-Present
National Centre of Nuclear Robotics, University of Birmingham
Extreme Robotics Lab (PI: Rustam Stolkin)
Leading the Human-Robot Teaming group
Research in Variable Autonomy, Human-Robot Teaming, HRI, Human Factors

Research Fellow (Postdoc) 2018-2019
National Centre of Nuclear Robotics, University of Birmingham
Extreme Robotics Lab (PI: Rustam Stolkin)
Research in Variable Autonomy, Human-Robot Teaming, HRI, Human Factors

Research Scientist 2017-2018
Greek Army Center of Informatics
Part of conscript military service

Research Assistant 2017 (5 months)
University of Birmingham
Extreme Robotics Lab (PI: Rustam Stolkin)
Research in Variable Autonomy, Human-Robot Teaming, HRI, Human Factors

Research Assistant 2013 (6 months)
School of Psychology, University of Birmingham,
PI: Dietmar Heinke
Research in Brain-Computer-Interfaces using EEG signals to move robots

Education

PhD in Robotics 2017
University of Birmingham

MSc in Computational Intelligence 2012
University of Sheffield

BEng in Automation Engineering 2011
University of West Attica

Teaching

Guest Lecturer 2018
Artificial Intelligence MSc joint course
University of West Attica
Delivered 2 lectures on swarm robotics

Teaching Assistant 2014-2017
Robot Programming undergraduate course
School of Computer Science, University of Birmingham
Small groups tutoring, teaching labs, marking, curriculum design

Lead Organiser and Lecturer 2015
Robotics Hack Day one-day workshop
School of Computer Science, University of Birmingham
Hands-on robotics skills, open to all Computer Science students

Supervision & Mentoring

PhD Supervision 2020-Present
Principal supervisor of 2 PhD students
Co-supervisor (faculty): Rustam Stolkin
Supervision has led to 3 publications

Interns & research assistants 2014-Present
Directly supervised 13 MSc and undergraduate students
Supervision has led to 7 publications
From the Uni. Of Birmingham and various institutions across the world
Erasmus+, research visits, KONICOF internships
Completed Internships, thesis, and research projects, both remotely and in person

Leading the Birmingham Autonomous Robotics Club 2014-2016
A robotics club where students were getting hands-on experience in using state-of-the-art robots. This was done through student projects, workshops, and participating in robotic competitions such as the EU Commission-funded RoCKIN@Home robotics challenge.

Institutional Leadership & Citizenship (UoB)

Organising the biweekly Extreme Robotics Lab Seminars 2020-2022
Talks by internal and external prestigious speakers
Brainstorming and discussion sessions

PhD Assessment Panel Member (regular) 2019-Present
Assessing PhD students' yearly progress in the Extreme Robotics Lab

Interview and Hiring Assessment Panel Member (regular) 2019-Present
Hiring of new postdoctoral researchers and PhD students in the Extreme Robotics Lab

Owner and maintainer of the Extreme Robotics Lab's GitHub 2019-Present
https://github.com/uob-erl

Responsible for Ethics Applications 2018-Present
Leading, writing and submitting ethics applications for the Extreme robotics lab projects that include human participants
5 HRT/HRI projects so far have been approved by the Uni. Of Birmingham ethics committee

Line Manager for the Human-Robot Teaming group 2018-Present
Line manager, admin, and paperwork responsibilities
Indicative responsibilities: liaising with admissions and graduate school, casual work paperwork and supervision, liaising for VISA checks, writing ATAS

Academic Leadership & Service

Workshop Organiser at ACM/IEEE HRI 2023 conference
"Variable Autonomy for human-robot Teaming (VAT)" workshop (accepted)

Program Committee for AAMAS 2023 conference

Conference Reviewing
AAMAS, IEEE/RSJ IROS, IEEE ICRA, ACM/IEEE HRI, IEEE SMC, IEEE ROMAN

Journal Reviewing
IEEE Robotics & Automation Letters, ACM Transactions on Human-Robot-Interaction, IEEE Transactions on Human-Machine Systems

Awards and Honours

Finalist, best paper award in IEEE/RSJ IROS 2022

In safety, security, and rescue robotics category
Paper: “Robot-Assisted Nuclear Disaster Response: Report and Insights from a Field Exercise.”

Finalist, best paper award in IEEE/RSJ IROS 2016
In cognitive robotics category
Paper “Experimental analysis of a variable autonomy framework for controlling a remotely operating mobile robot.”

Won RoCKIn@Home robotics challenge prizes 2015
With Uni. of Birmingham robotics club
Best team in functionality benchmark “Object Perception”
Third overall place in the competition

Won RoCKIn@Home robotics challenge prizes 2014
With Uni. of Birmingham robotics club
Best team in task benchmark ‘‘Getting to know my home”
Best team in task benchmark “Welcoming Visitors”
Second overall place in the competition.

Invited Talks

“Human-Robot Teaming in Remotely Operated Robotic Systems” 2022
Responsible AI group
Department of Computing Science, Umea University

“Towards Mixed-Initiative Control in Remotely Operated Robots” 2021
Cooperative Systems Group
Institute of Control Systems, Karlsruhe Institute of Technology

“Towards Robotic Systems that can Regulate their Autonomy Level” 2019
Frontiers of robotics research seminar series
Lincoln Centre for Autonomous Systems Research, University of Lincoln

“Variable Autonomy in Mobile Robots” 2016
Matsuno Lab
School of Engineering, Kyoto University

Grants

Nuclear Decommissioning Authority (NDA) 2023 PhD bursaries, UK 2022
Title: “Variable autonomy control paradigms applied to mobile manipulator decommissioning robots”
PI: Prof. Rustam Stolkin
Role Manolis Chiou: CO-I, co-author
Funding: £93,750
Under review

The Faraday Institution Industry Sprint - T4MaDEV project 2022
Title: "Telerobotics for Making Damaged EV Batteries Safe"
PI: Dr Alireza Rastegarpanah
Role Manolis Chiou: CO-I, co-author, work package leader
Funding: £292,393
A moratorium was placed in the call/funding while the proposal was under review

NCNR Flexible Partnership Funding 2019
Title: "Haptic-guided shared control of mobile manipulation task"
PI: Dr Amir Ghalamzan
Role Manolis Chiou: proposal contributor, funding acquired with my assistance
Funding: £125,730

Outreach Activities

"Robot Lab Live" for UK Festival of Robotics 2021
Extreme Robotics Lab organiser and delivered one of the talks
Live streaming showcasing labs across the UK by EPSRC UK Robotics and Autonomous Systems

"Robotics masterclasses" for the Royal Institution of Great Britain 2015-2016
Organised and delivered 5 talks and classes to teach and promote robotics and science in schools across the UK.

Work experience workshops 2015-2016
Organised and delivered two workshops to give high school students a taste of Computer Science. Hosted by the University of Birmingham.

General Science Outreach 2010-Present
Showcased robotics in a plethora of science outreach events.
Among others: I2fest; Athens Digital; University of Birmingham open days; BBC´s "Make it Digital" and others

Journal Publications

[J1] Ramesh, A., Stolkin, R., & **Chiou, M.** (2022). *Robot Vitals and Robot Health: Towards Systematically Quantifying Runtime Performance Degradation in Robots Under Adverse Conditions*. IEEE Robotics and Automation Letters (RA-L), 7(4), 10729–10736. https://doi.org/10.1109/LRA.2022.3192612

[J2] Methnani, L., **Chiou, M.**, Dignum, V., & Theodorou, A. (2022). *Who's in Charge Here? A survey on Trustworthy AI in Variable Autonomy Robotic Systems.* ACM Computing Surveys (CSUR), Under Review.

[J3] **Chiou, M.**, Hawes, N., & Stolkin, R. (2021). *Mixed-initiative Variable Autonomy for Remotely Operated Mobile Robots.* ACM Transactions on Human-Robot Interaction(T-HRI), 10(4), 1–34. https://doi.org/10.1145/3472206

Conference Publications

[C1] **Chiou, M.**, Epsimos, G.-T., Nikolaou, G., Pappas, P., Petousakis, G., & Stefan, M. (2022). *Robot-Assisted Nuclear Disaster Response: Report and Insights from a Field Exercise.* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). In Press. **Finalist, best paper award.**

[C2] Rothfus, S., **Chiou, M.**, Inga, J., Hohmann, S., & Stolkin, R. (2022). *A Negotiation-Theoretic Framework for Control Authority Transfer in Mixed-Initiative Robotic Systems.* IEEE International Conference on Systems, Man, and Cybernetics (SMC), 1, 921–928. https://doi.org/10.1109/SMC53654.2022.9945196

[C3] Ruan, T., Wang, H., Stolkin, R., & **Chiou, M.** (2022). *A Taxonomy of Semantic Information in Robot-Assisted Disaster Response.* IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR). In Press.

[C4] Panagopoulos, D., Petousakis, G., Ramesh, A., Ruan, T., Nikolaou, G., Stolkin, R., & **Chiou, M.** (2022). *A Hierarchical Variable Autonomy Mixed-Initiative Framework for Human-Robot Teaming in Mobile Robotics*. IEEE International Conference on Human-Machine Systems (ICHMS). In Press

[C5] Panagopoulos, D., Petousakis, G., Stolkin, R., Nikolaou, G., & **Chiou, M**. (2021). *A Bayesian-Based Approach to Human Operator Intent Recognition in Remote Mobile Robot Navigation*. IEEE International Conference on Systems, Man, and Cybernetics (SMC), 125–131. https://doi.org/10.1109/SMC52423.2021.9658942

[C6] Chatzithanos, P., Nikolaou, G., Stolkin, R., & **Chiou, M.** (2021). *Fessonia: A Method for Real-Time Estimation of Human Operator Workload Using Behavioural Entropy*. IEEE International Conference on Systems, Man, and Cybernetics (SMC), 1325–1331. https://doi.org/10.1109/SMC52423.2021.9658880

[C7] Ramesh, A., **Chiou, M.**, & Stolkin, R. (2021). *Robot Vitals and Robot Health: An Intuitive Approach to Quantifying and Communicating Predicted Robot Performance Degradation in Human-Robot Teams.* ACM/IEEE International Conference on Human-Robot Interaction (HRI), 303–307. https://doi.org/10.1145/3434074.3447181

[C8] **Chiou, M.**, McCabe, F., Grigoriou, M., & Stolkin, R. (2021). *Trust, Shared Understanding and Locus of Control in Mixed-Initiative Robotic Systems.* IEEE International Conference on Robot & Human Interactive Communication (RO-MAN), 684–691. https://doi.org/10.1109/RO-MAN50785.2021.9515476

[C9] Petousakis, G., **Chiou, M.**, Nikolaou, G., & Stolkin, R. (2020). *Human operator cognitive availability aware Mixed-Initiative control.* IEEE International Conference on Human-Machine Systems (ICHMS), 1–4. https://doi.org/10.1109/ICHMS49158.2020.9209582

[C10] Pappas, P., **Chiou, M.**, Epsimos, G. T., Nikolaou, G., & Stolkin, R. (2020). *VFH+ based shared control for remotely operated mobile robots*. IEEE International Symposium on Safety, Security, and Rescue Robotics, (SSRR), 366–373. https://doi.org/10.1109/SSRR50563.2020.9292585

[C11] **Chiou, M.**, Talha, M., & Stolkin, R. (2019). *Learning effects in variable autonomy human-robot systems: how much training is enough?* IEEE International Conference on Systems, Man and Cybernetics (SMC), 720–727. https://doi.org/10.1109/SMC.2019.8914558

[C12] **Chiou, M.**, Bieksaite, G., Hawes, N., & Stolkin, R. (2016). *Human-Initiative Variable Autonomy: An Experimental Analysis of the Interactions Between a Human Operator and a Remotely Operated Mobile Robot which also Possesses Autonomous Capabilities.* AAAI Fall Symposium Series: Shared Autonomy in Research and Practice, 304–310. http://www.aaai.org/ocs/index.php/FSS/FSS16/paper/download/14098/13706

[C13] **Chiou, M.**, Stolkin, R., Bieksaite, G., Hawes, N., Shapiro, K. L., & Harrison, T. S. (2016). *Experimental analysis of a variable autonomy framework for controlling a remotely operating mobile robot.* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 3581–3588. https://doi.org/10.1109/IROS.2016.7759527 **Finalist, best paper award.**

[C14] **Chiou, M.**, Hawes, N., Stolkin, R., Shapiro, K. L., Kerlin, J. R., & Clouter, A. (2015). *Towards the Principled Study of Variable Autonomy in Mobile Robots*. IEEE International Conference on Systems, Man, and Cybernetics (SMC), 1053–1059. https://doi.org/10.1109/SMC.2015.190