# Elena Corina Grigore

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## Research Interests

Robotics, machine learning, artificial intelligence, human-robot collaboration, adaptive systems, reinforcement learning, deep learning, multi-agent systems.

## Education

- **Doctor of Philosophy, Computer Science, Yale University, USA** 2012 – present
  Advisor: Brian Scassellati
  Area of study: Learning Supportive Behaviors for Adaptive Robots in Human-Robot Collaboration
- **Master of Philosophy, Computer Science, Yale University, USA** 2015
- **Master of Science, Computer Science, Yale University, USA** 2015
- **Master of Engineering with Study Abroad**
  **Computer Science, University of Bristol, UK** 2012
  Advisors: Kerstin Eder (University of Bristol, UK)
  Anthony G. Pipe (Bristol Robotics Laboratory, UK)
  Christopher Melhuish (Bristol Robotics Laboratory, UK)
  Thesis: *"I Robot, I Think"*
  4-year program encompassing my Bachelor's degree
  Study Abroad at University of California, San Diego (2010/2011)
  Master of Engineering with First Class Honors
- **Coventry University, UK** 2009
  Completed first year of Computing Honors Degree
  Highest scoring student in my cohort
  Transfer to University of Bristol at the end of my first undergraduate year

## Recent Work

- **Research Intern at Uber Advanced Technologies Group, San Francisco, USA** 2017
  Integrating temporal context into deep learning networks for self-driving car perception
- **Ongoing Dissertation Work** 2017
  Learning task and user preference models in human-robot collaboration for predicting useful supportive behaviors, tailored to a human peer [15]

## Publications

[15] **E. C. Grigore**, O. Mangin, A. Roncone, and B. Scassellati, "Predicting supportive behaviors based on user preferences for human-robot collaboration", In submission, 2017.

[14] **E. C. Grigore** and B. Scassellati, "Discovering action primitive granularity from human motion for human-robot collaboration", in *Robotics: Science and Systems (RSS)*, Boston, USA, 2017, July 12–16.

[13] **E. C. Grigore** and B. Scassellati, "Hierarchical multi-agent reinforcement learning through communicative actions for human-robot collaboration", in *Proceedings of the Future of Interactive Learning Machines (FILM) Workshop at the 30th Annual Conference on Neural Information Processing Systems (NIPS)*, Full paper, Barcelona, Spain, 2016, December 5–10.

[12] **E. C. Grigore**, A. Pereira, J. J. Yang, I. Zhou, D. Wang, and B. Scassellati, "Comparing ways to trigger migration between a robot and a virtually embodied character", in *Proceedings of the 8th International Conference on Social Robotics (ICSR)*, Kansas City, USA: Springer, 2016, November 1–3, 839–849. **Best student paper finalist.**

[11] **E. C. Grigore**, A. Pereira, I. Yang, D. Wang, and B. Scassellati, "Talk to me: verbal communication improves perceptions of friendship and social presence in human-robot interaction", in *Proceedings of the 16th International Conferences on Intelligent Virtual Agents (IVA)*, Los Angeles, USA: Springer, 51–63. **Best paper finalist.**

[10] A. Suman, R. Marvin, **E. C. Grigore**, H. Admoni, and B. Scassellati, "Prior behavior impacts human mimicry of robots", in *Proceedings of the 25th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, New York, USA, 2016, August 26–31, pp. 1057–1062.

[9] **E. C. Grigore** and B. Scassellati, "Constructing policies for supportive behaviors and communicative actions in human-robot teaming", in *Proceedings of the HRI Pioneers Workshop at the 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Christchurch, New Zealand, 2016, March 7–10, pp. 615–616.

[8] **E. C. Grigore**, A. Pereira, and B. Scassellati, "Modeling motivational states in adaptive robot companions", in *2015 AAAI Fall Symposium Series*, 2015, November 12–14.

[7] **E. C. Grigore**, "Modeling motivational states through interpreting physical activity data for adaptive robot companions", in *Proceedings of the 23rd International Conference on User Modelling, Adaptation and Personalization (UMAP)*, Dublin, Ireland: Springer, 2015, June 29–July 3, pp. 379–384.

[6] **E. C. Grigore** and B. Scassellati, "Maintaining engagement in shared goals with a personal robot companion through motivational state modeling", in *Proceedings of the Human-Robot Teaming Workshop at the 10th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Portland, OR, 2015, March 2–5.

[5] B. Hayes, **E. C. Grigore**, A. Litoiu, A. Ramachandran, and B. Scassellati, "A developmentally inspired transfer learning approach for predicting skill durations", in *Proceedings of the 4th Joint IEEE International Conferences on Development and Learning and Epigenetic Robotics (ICDL-Epirob)*, IEEE, 2014, October 13–16, pp. 181–186.

[4] E. Short, K. Swift-Spong, J. Greczek, A. Ramachandran, A. Litoiu, **E. C. Grigore**, D. Feil-Seifer, S. Shuster, J. J. Lee, S. Huang, *et al.*, "How to train your dragonbot: socially assistive robots for teaching children about nutrition through play", in *Proceedings of the 23rd IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, IEEE, 2014, August 25–29, pp. 924–929.

[3] **E. C. Grigore** and B. Scassellati, "Feasibility of sar approaches – helping children with learning tasks", in *Proceedings of International Workshop on Developmental Social Robotics (DevSor): Reasoning about Human, Perspective, Affordances and Effort for Socially Situated Robots at the 26th IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, 2013, November 3–7, pp. 22–24.

[2] **E. C. Grigore**, K. Eder, A. G. Pipe, C. Melhuish, and U. Leonards, "Joint action understanding improves robot-to-human object handover", in *Proceedings of the 26th IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2013, November 3–7, pp. 4622–4629.

[1] **E. C. Grigore**, K. Eder, A. Lenz, S. Skachek, A. G. Pipe, and C. Melhuish, "Towards safe human-robot interaction", in *Proceedings of the 12th Annual Towards Autonomous Robotic Systems (TAROS)*, Springer, 2011, August 31–September 2, pp. 323–335.

## Honors and Awards

- **Best Paper Finalist, Intelligent Virtual Agents (IVA)** 2016
  "Verbal Communication Improves Perceptions of Friendship and Social Presence in Human-Robot Interaction"
- **Best Student Paper Finalist, International Conference on Social Robotics (ICSR)** 2016
  "Comparing Ways to Trigger Migration between a Robot and a Virtually Embodied Character"
- **Human-Robot Interaction (HRI) Pioneer** 2016
  Highly selective workshop that seeks to foster creativity and collaboration across HRI
- **Tocher Fellowship, Yale University, USA** 2015
- **Tocher Fellowship, Yale University, USA** 2014
- **EPSRC (Engineering and Physical Sciences Research Council) Fellowship, UK** 2011
  Summer Research Project at the Bristol Robotics Lab, Bristol, UK
- **EPSRC Fellowship, UK** 2010
  Summer Research Project at the Bristol Robotics Lab, Bristol, UK
- **Head of Promotion Honorary Prize, Piatra Neamț Computer Science High School, Romania** 2008

## Invited Talks

- Virtual Assistant Summit, San Francisco, CA
  *Can You Lend Me a Hand? Helpers of the Future* 2017
- STEM Coffee Hour Facilitator, Cheshire, CT
  *How is AI Shaping Robotics?* 2017
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) International Workshop on Developmental Social Robotics (DevSor), Tokyo
  *Feasibility of SAR Approaches? Helping Children with Learning Tasks* 2013

## Thesis

[Master's Thesis] **E. C. Grigore**, "I Robot, I Think", University of Bristol, UK (work performed at the Bristol Robotics Lab, Bristol, UK), 2012.

## Research Experience

- **Yale University, Social Robotics Laboratory, CT, USA**
  - *Learning Supportive Behaviors for Adaptive Robots in Human-Robot Collaboration* 2014 – present
    Applying machine learning techniques to endow robots with learning capabilities needed when placed in new environments or faced with new tasks. This includes learning about the structure and progression of a physical task, as well as about the actions human workers perform during this task. Investigating techniques including Hidden Markov Models and reinforcement learning in single- and multi-agent settings, where the robot's aim is to provide supportive behaviors in human-robot collaboration scenarios.

- *User modeling for motivational states within a reinforcement learning framework* 2013 – 2015
  Designed a system for long-term robot companions that employs a model of users' daily motivational states within a reinforcement learning framework.

- *Developed a robot for interaction with children in an educational setting* 2012 – 2014
  Built, assembled, and programmed research robot platform DragonBot for interaction with children. Performed human-robot interaction study at local schools.

- **University of Bristol and the Bristol Robotics Laboratory, Bristol, UK**

  - *Master of Engineering "I Robot, I Think" Thesis Project* 2011 – 2012
    Applied machine learning techniques to model users' intentions for object handovers in human-robot interaction scenarios.

  - *"I Robot... I Learn" Summer Research Project* 2011
    Implemented a machine learning algorithm for estimating the state of object handovers in human-robot interaction scenarios.

  - *"I Robot... and Beyond" Summer Research Project* 2010
    Investigated safety and liveness properties rooted in design verification principles for a human-robot interaction system.

## Work Experience

- **Research Intern at Uber Advanced Technologies Group, San Francisco, USA** 2017
  **Deep learning for self-driving car perception team**

  Worked on the perception module of the self-driving pipeline, where the aim was to detect all targets of interest in the environment of the autonomous vehicle. Researched introducing temporal context into deep learning networks, including the use of multi-frames and recurrent neural networks.

  *Outcome:* Gained experience using large scale deep learning models for detection, and developed research skills relevant to working with region-based convolutional neural networks and recurrent neural networks. Gained experience using the newly released Google Object Detection codebase, TensorFlow, and its associated utilities for working with large datasets (e.g., TFRecords). Worked in a fast-paced team, and collaborated with colleagues to implement novel ideas for the team's deep learning models.

- **Student-teacher at Sidney Stringer School, Coventry, UK** 2009
  **The Student Associates Scheme, UK**

  Worked within the Mathematics Department as a student-teacher providing help for students during classes, raising students' aspirations for higher education. Produced and delivered presentations and a programming-based project and also delivered a lesson.

  *Outcome:* Developed communication, presentation and leadership skills, effectively coordinated groups of students and worked together with teachers and other student-teachers in a motivating environment.

## Skills

- Programming languages: Python, R, Matlab, Java, C++, HTML, PHP, CSS, LaTeX
- Libraries: TensorFlow, NumPy, Brown-UMBC Reinforcement Learning and Planning (BURLAP)
- Software/IDEs: Git, PyCharm, Eclipse, Visual Studio, NetBeans, Xcode
- Robotics/hardware platforms: Baxter, Keepon, Nao, ROS, YARP, PhaseSpace Motion Capture System

## Academic Service and Membership

- Conference and Workshop Committee Leadership
  - International Conference on Intelligent Virtual Agents
    Program Committee Member 2017
  - ACM/IEEE International Conference on Human-Robot Interaction
    Program Committee Member 2017
  - IEEE/RSJ International Conference on Intelligent Robots and Systems
    Synergies Between Learning and Interaction (SBLI) Workshop
    Program Committee Member 2017
  - ACM/IEEE International Conference on Human-Robot Interaction
    Pioneers Workshop Panel Chair 2017
- Conference Refereeing service
  - IEEE/RSJ International Conference on Intelligent Robots and Systems 2017
  - EEE-RAS International Conference on Humanoid Robots 2017
  - IEEE Transactions on Automation Science and Engineering 2017
  - IEEE/RSJ International Conference on Intelligent Robots and Systems 2017
  - IEEE International Symposium on Robot and Human Interactive Communication 2016
  - Elsevier Cognitive Systems Research Journal 2016
  - ACM/IEEE International Conference on Human-Robot Interaction 2015 – 2016
  - Affective Computing and Intelligent Interaction 2015
  - IEEE/RSJ International Conference on Intelligent Robots and Systems 2014
- Membership in Professional Societies
  - Association for the Advancement of Artificial Intelligence 2014 – present
  - IEEE 2014 – present
  - Cognitive Science Society 2014 – present
- Outreach
  - World Science Festival, New York City 2014
  - Routine lab tours and open houses, Yale Social Robotics Lab, CT 2012 – present
  - Routine outreach activities involving robot demos at local schools, CT 2012 – present
- Book Reviewing
  - *Visual Analysis of Behaviour – From Pixels to Semantics*, by Gong S, Xiang T 2012

## Teaching Experience and Mentorship

- Mentoring high-school and undergraduate students on research projects 2013 – present
- Teaching Fellow (at Yale University, USA)
  - Mathematical Tools for Computer Science (CPSC 202A) 2014 – 2015
  - Intelligent Robotics (CPSC 473) 2013 – 2015
  - Intelligent Robotics Lab (CPSC 472) 2013
- Point of contact for incoming Romanian students, University of Bristol, UK 2009 – 2012
- Mathematics student-teacher at Sydney Stringer School, Coventry, UK
  Students Associates Scheme 2009
- Course Representative, Coventry University, Coventry, UK
  Speaking on behalf of the student body 2008 – 2009

## Conferences and Summer Schools Attended

- Robotics: Science and Systems
  Presented talk for accepted paper 2017
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
  Organized and moderated the Pioneers Workshop Panel 2016
- Annual Conference on Neural Information Processing Systems (NIPS)
  Presented talk for workshop full paper 2016
- International Conference on Intelligent Virtual Agents (IVA)
  Presented paper for best paper finalist category 2016
- International Conference on Social Robotics (ICSR)
  Presented paper for best student paper finalist category 2016
- International Conference on Machine Learning (ICML) 2016
- International Joint Conference on Artificial Intelligence (IJCAI) 2016
- AAAI Fall Symposium Series
  Presented talk for accepted paper 2015
- Max Planck Institute for Intelligent Systems Machine Learning Summer School, Germany
  (**20% acceptance rate**) 2015
- The International Conference on User Modelling, Adaptation and Personalization (UMAP)
  Presented talk for accepted paper 2015
- The ACM/IEEE International Conference on Human-Robot Interaction (HRI)
  Presented talk for accepted paper 2015
- The AAAI Conference on Artificial Intelligence (AAAI)
  Presented robot demo 2014
- The Cognitive Science Society Annual Conference (CogSci)
  Presented robot demo 2014
- The IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  Presented talk for accepted paper and invited talk for the DevSor Workshop 2013
- The First Summer School on Social Human-Robot Interaction, UK 2013
- The Conference Towards Autonomous Robotic Systems (TAROS)
  Presented talk for accepted paper 2011

## Languages

- Romanian – native language
- English – fluent: written and spoken
- Spanish – conversational: spoken
- French – basic: written and spoken