Kim Baraka

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EDUCATION

Carnegie Mellon University, Robotics Institute   PITTSBURGH, PA, USA

Instituto Superior Técnico, Department of Electrical & Computer Engineering   LISBON, PORTUGAL
Dual Ph.D. in Robotics (in progress)   *Aug '16 – present*
Carnegie Mellon / Portugal dual degree Ph.D. program. Co-advised by Prof. Manuela Veloso and Prof. Francisco S. Melo. GPA: 4.0/4.0. Expected year of graduation: 2020.

Carnegie Mellon University, Robotics Institute   PITTSBURGH, PA, USA
M.S. in Robotics   *Aug '14 – May '16*
Advised by Prof. Manuela Veloso. GPA: 4.0/4.0.

American University of Beirut (AUB)   BEIRUT, LEBANON
Bachelor in Electrical & Computer Engineering   *Oct '09 – Dec '13*
Graduated with High Distinction. Minor in Physics; minor in Mathematics; minor in Philosophy. GPA: 4.0/4.0.

Grand Lycée Franco-Libanais   BEIRUT, LEBANON
Scientific French Baccalaureate (emphasis in Mathematics)   *Sep '06 – Jun '09*
Graduated with Honors ("congratulations of the jury").

RESEARCH

INESC-ID / Instituto Superior Técnico   LISBON, PORTUGAL
Junior Researcher   *May '17 – present*
- Working as part of the Group of Artificial Intelligence for People and Society (GAIPS) led by Prof. Ana Paiva
- Conducting research, as part of my Ph.D., on adaptive algorithms for personalized interactions between a mobile robot and autistic children. I am part of the INSIDE project in partnership with the Child Development Center at the Hospital Garcia de Orta in Almada, Portugal.

Carnegie Mellon University   PITTSBURGH, PA, USA
Graduate research assistant   *Jan '15 – present*
- Working as part of the CORAL group led by Prof. Manuela Veloso.
- As part of my Master's research, conducted research on robot internal state transparency and action explanation using non-verbal communication, and developed algorithms to adapt and personalize long-term interactions between robots and humans. I mainly worked on CoBot, a symbiotically autonomous mobile robot.
- Ph.D. research in the CORAL group is identical to the description in the previous section.

INESC-ID   LISBON, PORTUGAL
Visiting Researcher   *Jun – Jul '15*
- Conducted research in Human-Robot Interaction in the Group of Artificial Intelligence for People and Society (GAIPS) as part of the INSIDE project under Prof. Ana Paiva.
- Programmed a mobile social robot for fluid interaction in a study with autistic children.
- Integrated a 3D animation software with Rethink Robotics's Baxter robot.

American University of Beirut   BEIRUT, LEBANON
Research Assistant: Task scheduling in the future Smart Power Grid   *Oct '13 – Jul '14*
Designed a fast heuristic algorithm for the NP-hard Resource Leveling Problem (RLP) in the context of task scheduling for houses connected to the future Smart Grid. This research was supervised by Prof. Rouwaida Kanj and Prof. Fadi Zaraket.

Research Assistant: Vehicular Ad Hoc Networks (VANET)   *Feb – May '13*
Designed a smart sensing architecture for cognitive vehicular ad hoc networks. The protocol designed was meant to be integrated with the existing WAVE (Wireless Access in Vehicular Environment) industry standard. This research was supervised by Prof. Hassan Artail.

OTHER TECHNICAL WORK

CERN (European Organization for Nuclear Research) — Geneva, Switzerland
Summer Intern — *Jun – Jul '13*
- Interned as part of the Summer Students Program, supervised by Dr. Christian Lippmann.
- Contributed to Garfield++, a software for detailed simulation of gaseous particle detectors, and studied its applications to the Time Projection Chamber of the ALICE experiment on the Large Hadron Collider.

Musical Lights — Beirut, Lebanon
Main Engineer — *Oct '13 – Jul '14*
- Designed and implemented an innovative interactive music educational system as part of a startup. Users learned the piano using colored lights over the piano keys matching color-coded finger gloves.
- Strategized the patenting of the idea (U.S. patent application No. 20150332601) and contributed to the technical details of the patent.

University of California San Diego — San Diego, CA, USA
Summer Intern — *Jul – Aug '12*
- Worked in the Telecom Integrated Circuits and Systems group under Prof. Gabriel Rebeiz.
- Built and tested all parts of a 7 MHz Ham Radio on a Printed Circuit board.

TEACHING

Instituto Superior Técnico, Department of Computer Science and Engineering — Lisbon, Portugal
Machine Learning and Intelligent Decision Making (graduate) — *Feb – June '18*
Taught several lectures and weekly lab sessions. Assisted in assignment and exam grading and preparation.

Carnegie Mellon University, Robotics Institute — Pittsburgh, PA, USA
Human-Robot Interaction (graduate) — *Jan – May '17*
Assisted in assignment grading and preparation, as well as project evaluation and logistics.

American University of Beirut, Dept. of Electrical and Computer Engineering — Beirut, Lebanon
Digital Integrated Circuits (undergraduate/graduate) — *Feb – May '13*
Assisted in homework solutions/corrections and lab assignments.
Electronic Circuits (undergraduate) — *Oct '12 – Jan '13 & Feb – May '13*
Taught weekly problem solving sessions to undergraduate students.

MENTORING

Carnegie Mellon Undergraduate Research Opportunities — Pittsburgh, PA, USA
Jocelyn Huang and Patrick Lin — *Jan – May '17*
Designing autism-like behaviors for a humanoid robot.
Minji Kim and Harleigh Awner — *Jan – May '17*
Building a 3D animated avatar exhibiting autism-like behaviors.

COMPLETED THESES

Carnegie Mellon University — Pittsburgh, PA, USA
Master's Thesis: "Effective Non-Verbal Communication for Mobile Robots using Expressive Lights"
May '16
Thesis Committee: Prof. Manuela Veloso, Prof. Illah Nourbakhsh, Prof. Stephanie Rosenthal and Prof. Heather Knight

American University of Beirut — Beirut, Lebanon
Bachelor's Thesis: "AAHA: Android/Arduino Home Automation System" — *May '13*
Supervisors: Prof. Rouwaida Kanj and Prof. Ayman Kayssi

PUBLICATIONS

Journals
- Baraka K., Veloso M.: *"Mobile Service Robot State Revealing through Expressive Lights: Formalism, Design and Evaluation"*, International Journal of Social Robotics 10.1 (2018): 65-92.
- Baraka K., Safatly L., Artail H., Ghandour A., El-Hajj A.: *"An Infrastructure-aided Cooperative Spectrum Sensing Scheme for Vehicular Ad Hoc Networks"*, Ad Hoc Networks 25, 197-212, Elsevier, 2015.

Conferences

- Baraka K., Melo F. S., Veloso M.: *" 'Autistic Robots' for Embodied Emulation of Behaviors Typically Seen in Children with Different Autism Severities"*, In Proceedings of ICSR'17, the International Conference on Social Robotics, Tsukuba, Japan, December, 2017.
- Baraka K., Melo F. S., Veloso M.: *"Data-Driven Generation of Synthetic Behavioral Feature Vectors Modeling Children with Autism Spectrum Disorders"*, In Proceedings of ICDL-EpiRob'17, theJoint IEEE International Conference on Development and Learning and Epigenetic Robotics, Lisbon, Portugal, September, 2017.
- Baraka K., Melo F. S., Veloso M.: *"Simulating Behaviors of Children with Autism Spectrum Disorders Through Reversal of the Autism Diagnosis Process"*, In Proceedings of EPIA'17, the Portuguese Conference on Artificial Intelligence, Porto, Portugal, September, 2017.
- Baraka K., Rosenthal S., Veloso M.: *"Enhancing Human Understanding of a Mobile Robot's State and Actions using Expressive Lights"*, In Proceedings of RO-MAN'16, the IEEE International Symposium on Robot and Human Interactive Communication, New York, USA, August, 2016.
- Baraka K., Veloso M.: *"Adaptive Interaction of Persistent Robots to User Temporal Preferences"*, In Proceedings of ICSR'15, the International Conference on Social Robots, Paris, France, October, 2015 (also presented as an invited poster at the 5th IBM Research Cognitive Colloquium, Yorktown Heights, NY, USA, September, 2016).
- Baraka K., Paiva A., Veloso M.: *"Expressive Lights for Revealing Mobile Service Robot State"*, In Proceedings of Robot'15, the Second Iberian Robotics Conference, Lisbon, Portugal, November, 2015.
- Baraka K., Ghobril M., Malek S., Kanj R., Kayssi A.: *"Low Cost Arduino/Android-Based Energy-Efficient Home Automation System with Smart Task Scheduling"*, In Proceedings of International Conference on Computational Intelligence, Communication Systems and Networks (CICSyN), 2013 (also presented at the 12th FEA Student and Alumni Conference at the American University of Beirut).

Workshops and Symposia

- Baraka K., Melo F. S., Veloso M.: *"Towards an Embodied Simulator of Autistic Child Behaviors: an Improved Method for Selecting Simulated Behaviors"*, In the HRI'18 Workshop on Social Robots in Therapy, Chicago, USA, March, 2018.
- Baraka K., Melo F. S., Veloso M.: *"Embodied Robotic Visualization of Autistic Child Behaviors with Varying Severities"*, In the 2nd Workshop on Behavior Adaptation, Interaction and Learning for Assistive Robotics at RO-MAN 2017, Lisbon, Portugal, September, 2017.
- Baraka K., Veloso M.: *"Multi-Channel Expression of State Information in a Mobile Service Robot using Animated Lights"*, In the IJCAI-2016 Workshop on Autonomous Mobile Service Robots, New York, USA, July, 2016.
- Baraka K., Paiva A., Veloso M.: *"Expressive Lights for Revealing Mobile Service Robot State"*, In the AAAI Fall Symposium on AI for Human-Robot Interaction, Arlington VA, USA, November, 2015).

AWARDS and HONORS

- **IEEE Student Enterprise Award** awarded for innovative Smart Home technology
- **Dean's Creative Achievement Award** awarded for creative innovation in Bachelor's thesis work
- **CMU/Portugal Ph.D. fellowship** awarded by the Fundação para a Ciência e a Tecnologia as part of the INSIDE project
- **Full Merit Scholarship** (all academic years at AUB)
- **Dean's Honor List** (all semesters at AUB)
- **"Most uncanny" Award** at the 2015 Robot Film Festival for movie featuring a Baxter robot programmed to dance with humans

SKILLS

Programming languages Python, C/C++, Matlab, Arduino, Java, C#, R, VHDL, Assembly ...

Software Mathematica, CAD, SPICE, Labview, OPNET, NS2, Xilinx, MPLAB, Proteus, CPLEX ...

Operating Systems Linux, ROS, Windows, macOS

Natural languages Fluent in English, French and Arabic. Advanced Portuguese.

SERVICE to PROFESSION

Reviewer

Reviewed papers for a number of peer-reviewed journals conferences, workshops and symposia, such as: (Journals) the ACM Transactions on Human-Robot Interaction (THRI), the International Journal of Social Robotics, the IEEE Systems Journal, the Journal of Software: Practice and Experience, the IEEE Transactions on Industrial Informatics, ...

(Conferences) the International Conference on Intelligent Robots and Systems (IROS), the International Conference on Humanoid Robots, the Joint International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob), the International Conference on Social Robots (ICSR), the International Symposium on Robot and Human Interactive Communication (RO-MAN), the International Conference of Human-Agent Interaction (HAI), ...

(Workshops/Symposia) the AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction, the RSS 2017 Workshop on Mathematical Models, Algorithms, and Human-Robot Interaction and the IEEE CORAL workshop.

Program committee member

1st International Workshop on EXplainable, TRansparent Agent and Multi-Agent Systems (EXTRAAMAS 2019)

3rd International Workshop on Evaluation Methods Standardization for Human-Robot Interaction

Reading group co-organizer   *Feb '18 - present*

Started a campus-wide HRI reading group at Instituto Superior Técnico, where papers are discussed on a weekly basis, and discussion minutes are posted online.

PROFESSIONAL ASSOCIATIONS

Institute of Electrical and Electronics Engineers (IEEE), member.

EXTRACURRICULAR ACTIVITIES

I have had and continue to have a very active involvement in the field of contemporary dance as a performer and choreographer. I have received a neoclassical dance training from the Beirut Dance Studio, taught ballet to adults and underprivileged children, and performed with the Beirut Dance Company and the Pillow Project, among others. I have started creating my own choreographic work and teaching improvisational contemporary dance. For more information on my artistic work, check this part of my website.

References

References are available upon request