



# Julia Ebert

PhD Candidate • Robotics Researcher

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## Education

<b>Cambridge, MA</b> 2016 – 2019	<b>Harvard University</b> <ul style="list-style-type: none"><li>› PhD Candidate in Computer Science</li><li>› Master of Science in Computer Science</li></ul> Advisor: Prof. Radhika Nagpal
<b>London, UK</b> 2016	<b>Imperial College London</b> <ul style="list-style-type: none"><li>› Master of Research in Bioengineering, with Distinction</li></ul> Marshall Scholar Advisors: Prof. Etienne Burdet, Dr. Ildar Farkhatdinov Thesis: <i>Assisting Balance Recovery with a Lower Limb Exoskeleton</i>
<b>Boston, MA</b> 2015	<b>Northeastern University</b> <ul style="list-style-type: none"><li>› Bachelor of Science in Behavioral Neuroscience, Minor in Computer Science</li></ul> GPA: 3.98 / 4.0, summa cum laude Honors Thesis: <i>Asymmetric Learning in an Asymmetric Bimanual Task</i>

## Peer-Reviewed Publications

**Julia Ebert**, Melvin Gauci, Frederik Mallmann-Trenn and Radhika Nagpal. 2019. Bayes Bots: Collective Bayesian Decision-Making in Decentralized Robot Swarms. Accepted to *ICRA 2020*.

Ildar Farkhatdinov, **Julia Ebert**, Gijs van Oort, Mark Vlutters, Edwin van Asseldonk and Etienne Burdet. 2019. Assisting Human Balance in Standing with a Robotic Exoskeleton. *IEEE Robotics and Automation Letters*, 4, 2, 414–421. [🔗](#)

**Julia Ebert**, Melvin Gauci and Radhika Nagpal. 2018. Multi-feature collective decision making in robot swarms. In *Proceedings of the 17th International Conference on Autonomous Agents and MultiAgent Systems*, 1711–1719. Stockholm, Sweden. [🔗](#)

Salah Bazzi, **Julia Ebert**, Neville Hogan and Dagmar Sternad. 2018. Stability and Predictability in Dynamically Complex Physical Interactions. In *2018 IEEE International Conference on Robotics and Automation (ICRA)*, 5540–5545. [🔗](#)

Salah Bazzi, **Julia Ebert**, Neville Hogan and Dagmar Sternad. 2018. Stability and predictability in human control of complex objects. *Chaos*, 28, 10. [🔗](#)

Se-Woong Park, **Julia Ebert** and Dagmar Sternad. Asymmetric Learning in an Asymmetric Bimanual Task. In preparation.

## Grants and Scholarships

2016 – 2020	Department of Energy Computational Science Graduate Fellowship (DOE CSGF) <a href="#">🔗</a>
2015 – 2016	Marshall Scholarship <a href="#">🔗</a>
2014	Northeastern Provost Undergraduate Advanced Research Award
2013 – 2015	Barry Goldwater Scholarship
2013	Northeastern Provost Undergraduate Research Award
2013	DAAD Undergraduate Scholarship
2013	Northeastern Presidential Global Scholarship <a href="#">🔗</a>
2010 – 2015	Northeastern National Merit Scholarship

## Awards

2018	Certificate of Distinction in Teaching, Harvard University Bok Center <a href="#">↗</a>
2016	Finalist, Hertz Fellowship <a href="#">↗</a>
2016	Honorable Mention, National Science Foundation Graduate Research Fellowship Program (NSF GRFP) <a href="#">↗</a>
2015	Northeastern Honors in Behavioral Neuroscience (for thesis) <a href="#">↗</a>
2015	Northeastern University Honors Program Distinction (for coursework) <a href="#">↗</a>
2015	Northeastern Alex Skavenski Award for Behavioral Neuroscience
2015	Northeastern Sears B. Condit Award for academic achievement
2010 – 2015	Northeastern Dean's List (6 semesters) <a href="#">↗</a>
2015	Finalist; Rhodes, Fulbright, and Mitchell Scholarships

## Research

<b>Cambridge, MA</b>	<b>Harvard University Self-Organizing Systems Research Group</b> Prof. Radhika Nagpal
2016 –	› Multi-feature perception and decision making in robot collectives <a href="#">↗</a> <i>Developing Bayesian and bio-inspired algorithms for collective decision-making in Kilobot robots, in both simulation and physical robots, including developing a parallelized, high-throughput Kilobot simulator.</i>
2017 –	› LARVAbot: Locomotion of autonomous robots via aggregation <a href="#">↗</a> <i>Designing and manufacturing a collective of 3D-printed robots to perform aggregate locomotion, inspired by the movement of sawfly larvae.</i>
<b>Livermore, CA</b>	<b>Lawrence Livermore National Laboratory</b> Dr. Michael Schneider
2018 –	› Collaborative Autonomy for Space Situational Awareness <a href="#">↗</a> <i>Developing a simulator for testing collective observation by low earth orbit satellite constellations.</i>
<b>London, UK</b>	<b>Imperial College Human Robotics Group</b> Prof. Etienne Burdet and Dr. Ildar Farkhatdinov
2015 – 2016	› Co-control of balance recovery in a lower limb exoskeleton <a href="#">↗</a> <i>Developed algorithms for human-robot co-control of the LOPES exoskeleton in both standing a walking balance recovery, and tested with human participants.</i>
<b>Boston, MA</b>	<b>Northeastern University Action Lab</b> Prof. Dagmar Sternad
2014 – 2015	› Prediction and stability in control of objects with complex dynamics <a href="#">↗</a> <i>Programmed HapticMaster robot (C++) for human-subject experiments and conducted pilot experiments.</i>
2012 – 2015	› Learning and long-term retention of an asymmetric bimanual task <a href="#">↗</a> <i>Designed and programmed experiments to assess ability of humans to learn a motor task with rhythmic and discrete components. Conducted multi-month data collection (including with EEG) and analysed results (Matlab) for Honors thesis.</i>
2011 – 2012	› Effects of central fatigue on cognitive and motor performance <i>Analyzed data (Matlab) to assess the effect of a prolonged motor experiment on cognitive fatigue in human subjects.</i>
<b>Nahant, MA</b>	<b>Northeastern University Marine Science Center</b> Prof. Joseph Ayers
May – Aug. 2015	› Neuro-inspired rheotaxis and antenna design in a robotic lobster <i>Contributed to development of flex-sensing antennae for lobster-inspired robot. Developed neuron-based biomimetic control (LabView) for using antennae to adjust robot control in response to water currents.</i>
<b>Watertown, MA</b>	<b>Interactive Motion Technologies</b>
July – Sept. 2014	› Integrated stroke assessment software in rehabilitation robotics <i>Developed a backend and interface (Python + Django) for integrating stroke assesment tools for clinicians into the rehabilitation robot.</i>
<b>Tübingen, DE</b>	<b>Max Planck Institute for Intelligent Systems</b> Prof. Stefan Schaal
July – Dec. 2013	› Learning and exploration in a novel dimensionality-reduction task <i>Designed a learning task in which subjects learned to map high-dimensional hand joint movements to move a 2D cursor, and conducted pilot experiments.</i>

## Conference Abstracts and Posters

**Julia Ebert**, Melvin Gauci and Radhika Nagpal. 2019. Bayes Bots: Bayesian Decision-Making for Robot Swarms. Poster at *DOE CSGF Program Review* (14–18 July 2019). Washington, DC. [↗](#)

**Julia Ebert**, Joshua Meyers, William Dawson and Michael Schneider. 2018. Collaborative Autonomy for Space Situational Awareness. Poster at *Lawrence Livermore National Laboratory Summer Student Poster Symposium* (8 August 2018). Livermore, CA. [↗](#)

**Julia Ebert**, Melvin Gauci and Radhika Nagpal. 2018. Multi-Feature Collective Decision Making in Robot Swarms. Poster at *DOE CSGF Program Review* (15–19 July 2018). Washington, DC. [↗](#)

**Julia Ebert**, Clark Teeple, Emma Steinhardt and Sharad Ramanathan. 2017. Infotaxis in a Multi-agent Sensor Network. Poster at *DOE CSGF Program Review* (24–27 July 2017). Washington, DC. [↗](#)

Ildar Farkhatdinov, **Julia Ebert**, Gijs van Oort, Edwin van Asseldonk and Etienne Burdet. 2017. Human Balance Augmentation with Lower Limb Exoskeleton Robot. Poster at *RehabWeek 2017 workshop: Towards a next generation of wearable robotic devices for human-oriented assistance and therapy* (17 July 2017). London, UK.

**Julia Ebert**, Ildar Farkhatdinov, Gijs van Oort, Edwin van Asseldonk and Etienne Burdet. 2016. Preliminary Study on Assisting Balance Recovery with Lower Limb Exoskeleton. Poster at *EuroHaptics 2016* (4–7 July 2016). London, UK. [↗](#)

Dagmar Sternad, Albert Mukovskiy, **Julia Ebert** and Tjeerd Dijkstra. 2016. Dynamic Stability in the Control of Complex Objects. Poster at *Biomechanics and Neural Control of Movement 2016* (12–17 June 2016). Mt. Sterling, OH.

**Julia Ebert**, Se-Woong Park and Dagmar Sternad. 2015. Asymmetric Learning in an Asymmetric Bimanual Task. Poster at *Society for the Neural Control of Movement 25th Annual Meeting* (20–24 April 2015). Charleston, SC. [↗](#)

**Julia Ebert**, Albert Mukovskiy, T Dijkstra and Dagmar Sternad. 2015. Why You Don't Spill Your Coffee. Poster at *Northeastern University Research, Innovation, and Scholarship Expo (RISE)* (9 April 2015). Boston, MA.

**Julia Ebert**, S Kim, Dagmar Sternad and Stefan Schaal. 2014. Learning and exploration in a novel dimensionality-reduction task. Poster at *Society for the Neural Control of Movement 24th Annual Meeting* (20–25 April 2014). Amsterdam, NL. [↗](#)

**Julia Ebert**, Se-Woong Park and Dagmar Sternad. 2014. Asymmetric Learning in an Asymmetric Bimanual Task. Poster at *Northeastern University Research, Innovation, and Scholarship Expo (RISE)* (10 April 2014). Boston, MA. [↗](#)

**Julia Ebert**, Se-Woong Park and Dagmar Sternad. 2013. Asymmetric Learning in an Asymmetric Bimanual Task. Poster at *Northeast Undergraduate Research and Development Symposium* (2–3 March 2013). Biddeford, ME. [↗](#)

**Julia Ebert**, Se-Woong Park, L Griffen, T O'Neil Pirozzi and Dagmar Sternad. 2012. Central Fatigue in Cognitive and Motor Performance. Poster at *Northeastern University Research, Innovation, and Scholarship Expo (RISE)* (29 March 2012). Boston, MA. [↗](#)

## Teaching and Mentoring

<b>Cambridge, MA</b> Summer 2019 Fall 2018, Fall 2019 Fall 2018, Fall 2019 Spring 2018	<b>Harvard University</b> <ul style="list-style-type: none"><li>› <b>REU mentor</b> for Kilobot research and outreach project</li><li>› <b>Teaching staff</b>, How To Make (Almost) Anything, Harvard section</li><li>› <b>Guest lecture</b>, CS 289: Biologically-inspired Multi-agent Systems</li><li>› <b>Teaching fellow</b>, CS 189: Autonomous Robot Systems <a href="#">↗</a></li></ul>
<b>Boston, MA</b> 2014 – 2015 2012 – 2014 2011 – 2013	<b>Northeastern University</b> <ul style="list-style-type: none"><li>› <b>Teaching assistant</b>, CS 2500: Fundamentals of Computer Science (2 semesters)</li><li>› <b>Tutor</b>, CS 2500: Fundamentals of Computer Science (3 semesters)</li><li>› <b>Undergraduate mentor</b>, Proactive Recruitment in Science and Mathematics (PRISM)</li></ul>

## Outreach and Service

2017, 2018, 2020	Volunteer, Boston Public Schools Science Fair
2018, 2019	Robot Design Judge, FIRST LEGO League
2018	Speaker, Science in the News fall lecture series: "Brains and Bodies: How to Make Smart Robots" <a href="#">↗</a>

2018	Guest, <i>Brains On!</i> science podcast live show <a href="#">@</a>
2016	Volunteer, EuroHaptics 2016
2010 – 2015	Volunteer, Northeastern Civic Engagement Program
2014 – 2015	Student Ambassador, Northeastern College of Science
2014	Tutor team leader, TechBoston Academy
2014	Teacher, NEU Splash Program. Class: "This is your Brain"
2011 – 2013	Volunteer, Brigham and Women's Hospital
2010 – 2011	Mentor, Massachusetts General Hospital Youth Program

## Skills

<b>Programming</b>	Python (including NumPy, Pandas, Django) · MATLAB · C/C++ (including OpenMP, AVR, Arduino) · HTML/CSS · LaTeX · JavaScript (including Vue.js) · Java
<b>Fabrication</b>	Laser cutting · 3D printing · Vinyl cutting · CNC milling · Electronics design (Eagle) and production · Soldering · Sewing · Molding and casting
<b>Other</b>	Computer-aided design (OnShape) · Database design · Linux · 3D motion capture · Kinematic and EEG data collection in human subjects

## Relevant Coursework

<b>Computer Science</b>	Biologically-inspired Multi-agent Systems · Distributed Systems · Machine Learning · Network Algorithms · Computational Neurodynamics · Artificial Intelligence · Robotics
<b>Science and Engineering</b>	Laboratory Electronics · How to Make (Almost) Anything · Biomimetics · Comparative Neurobiology · Human Neuroanatomy · Biochemistry · Genetics and Molecular Biology · Organic Chemistry
<b>Mathematics</b>	Stochastic Methods for Data Analysis, Inference, and Optimization · Biological Signal Processing · Statistics and Data Analysis · Multivariable Calculus · Linear Algebra · Differential Equations

## Activities and Interests

<b>Sport</b>	Harvard University curling team · Imperial College and Goodenough College fencing clubs · Cycling
<b>Music</b>	Northeastern University pep band, drumline, and wind ensemble · Clarinet · Saxophone · Percussion
<b>Other</b>	3D printing · Web design and development · Graphic design · Writing · Baking