

Curriculum Vitae

Miriam Goldberg

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Education

2021	MD/PhD (expected)	Rehabilitative Medicine and Engineering	UMass Medical School
2011	Post-Baccalaureate Certificate	Premedical Studies	UMass Boston
2010	Master's of Engineering	Autism Technologies	MIT Media Lab
2009	Bachelor's of Science	Computer Science and Engineering	MIT

Published Proceedings

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. "Testing a Novel Manual Communication System for Mechanically Ventilated ICU Patients." *Anesthesia & Analgesia*, 2017, in press, 1321: Washington, DC, May 6-9, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. "Principles of Augmentative & Alternative Communication System Design In The ICU Setting." *Anesthesia & Analgesia*, 2017, in press, 1715: Washington, DC, May 6-9, 2017.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. "Surveying ICU Nurses Regarding Perspectives On Patient Communication." *Anesthesia & Analgesia*, 2016, 122(5S), S-424: San Francisco, May 21-24, 2016.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. "Designing A Novel Manual Communication System For Mechanically Ventilated ICU Patients." *Anesthesia & Analgesia*, 2016, 122(5S), S-470: San Francisco, May 21-24, 2016.

Madsen, M., Mahmoud, A., Kashef, Y. "iSET: enabling in situ & post hoc video labeling." Proceedings of the 11th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS): Pittsburgh, Pennsylvania, USA, October 26-28, 2009. Won 1st prize in the Graduate category at the Student Research Competition.

Madsen, M., el Kaliouby, R., Goodwin, M., Picard, R.W. “Technology for Just-In-Time In-Situ Learning of Facial Affect for Persons Diagnosed with an Autism Spectrum Disorder.” Proceedings of the 10th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS): Halifax, Canada, October 2008.

Madsen, M.A., Kahana, M.J., Tully, M., Madsen, J.R. “Intermittent Oscillations in Simple Cellular Automata: Computational Models of Seizures and Physiologic Episodic Oscillations.” Proceedings of the Society for Neuroscience (SFN): San Diego, California, USA, 2004.

Conference Presentations

Madsen, M., el Kaliouby, R., Eckhardt, M., Goodwin, M., Hoque, M.E., Picard, R.W. “Demonstration: Interactive Social-Emotional Toolkit (iSET).” 3rd International Conference on Affective Computing and Intelligent Interaction (ACII): Amsterdam, The Netherlands, September 2009.

Madsen, M.A., Madsen, J.R. “Intermittent Oscillations in Simple Cellular Automata: Computational Models of Seizures and Physiologic Episodic Oscillations.” Slide presentation at the Society for Autonomous Neurodynamics (SAND): Quebec, Canada, summer 2007.

Conference Posters

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Testing a Novel Manual Communication System for Mechanically Ventilated ICU Patients.” UMass Center for Clinical and Translational Science (CCTS) Annual Research Retreat: Worcester, MA, May 16, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Principles of Augmentative & Alternative Communication System Design In The ICU Setting.” UMass Center for Clinical and Translational Science (CCTS) Annual Research Retreat: Worcester, MA, May 16, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Testing a Novel Manual Communication System for Mechanically Ventilated ICU Patients.” Association of University Anesthetists (AUA) annual meeting: Washington, DC, May 4-5, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Principles of Augmentative & Alternative Communication System Design In The ICU Setting.” Association of University Anesthetists (AUA) annual meeting: Washington, DC, May 4-5, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Testing a Novel Manual Communication System for Mechanically Ventilated ICU Patients.” Society of Critical Care Anesthesiologists (SOCCA) annual meeting: Washington, DC, May 5, 2017.

Goldberg, M. A., Hochberg, L. R., Carpenter, D., Isenberger, J., Heard, S. O., Walz, J. M. “Principles of Augmentative & Alternative Communication System Design In The ICU Setting.” Society of Critical Care Anesthesiologists (SOCCA) annual meeting: Washington, DC, May 5, 2017.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. “Designing A Novel Manual Communication System For Mechanically Ventilated ICU Patients.” Association of University Anesthetists (AUA) annual meeting: San Francisco, May 19-21, 2016. Received prize for Best Presented Poster.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. “Surveying ICU Nurses Regarding Perspectives On Patient Communication.” Association of University Anesthetists (AUA) annual meeting: San Francisco, May 19-21, 2016.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. “Designing A Novel Manual Communication System For Mechanically Ventilated ICU Patients.” Society of Critical Care Anesthesiologists (SOCCA) annual meeting: San Francisco, May 20, 2016.

Madsen, M. A., Hochberg, L. R., Heard, S. O., Walz, J. M. “Surveying ICU Nurses Regarding Perspectives On Patient Communication.” Society of Critical Care Anesthesiologists (SOCCA) annual meeting: San Francisco, May 20, 2016.

Gupta, S., Gupta, N., **Madsen, M.** “EASY Alliance: a new standard to enable access to consumer electronics and home appliances (CEHA) by seniors and the disabled.” IEEE Accessing the Future conference: Boston, Massachusetts, USA, July 20-21, 2009.

Eckhardt, M., **Madsen, M.**, Kashef, Y., Nasser, A.R. , Hoque, M.E., el Kaliouby, R., Goodwin, M., Picard, R.W. “User-Centered Design of Technology for Just-In-Time, In-Situ Exploration of Facial Affect for Persons on the Autism Spectrum” in the Extended Abstracts of IMFAR 2009: Chicago, Illinois, USA, May 7-9, 2009.

Madsen, M., el Kaliouby, R., Eckhardt, M., Hoque, M.E., Goodwin, M., Picard, R.W. “Lessons from Participatory Design with Adolescents on the Autism Spectrum.” CHI '09 Extended Abstracts on human factors in computing systems: Boston, Massachusetts, USA, April 4-9, 2009.
Madsen, M.A., Tully, M., Myers, D., Rimm-Kaufman, A., Kahana, M.J., Madsen, J.R. “Computer Investigation of Oscillations in Simple Cellular Automata: a model of brain activity accessible in secondary school.” Proceedings of the Society for Neuroscience (SFN): New Orleans, Louisiana, USA, Fall 2003.

Patents

Adaptive, Multimodal Communication System for Non-Speaking ICU Patients. **Madsen MA**. University of Massachusetts Media School, assignee. International Application No.: PCT/US16/66081.

Method and system for real-time and offline analysis, inference, tagging of and responding to person(s) experiences. el Kaliouby R, Picard RW, Mahmoud AN, Kashef Y, **Madsen MA**, Mikhail M. MIT Media Lab, assignee. United States 20110263946 A1. 2011.

Seminars / Talks

Anesthesiology Grand Rounds at the University of Massachusetts Medical Center, June 29, 2016. “Designing a Novel Manual Communication System for Mechanically Ventilated ICU Patients.”

Presentation to Rehabilitation Services at UMass Medical Center – University Campus location on PhD work. March 2015.

Presentation to Critical Care Operations Committee at UMass Medical Center – University Campus location on PhD work. March 2015.

Presentation at Horace Mann School on MIT autism technologies, Newton, MA. October 2009.

Presentation to Cleveland Clinic Autism Center on MIT autism technologies. October 2009.

Seminar at the Industrial Engineering & Management Department Meeting at the Technion in Haifa, Israel. “Technology for Just-In-Time In-Situ Learning of Facial Affect for Persons Diagnosed with an Autism Spectrum Disorder.” July 2008.

Seminar for the students and associates of Professor Anat Rafaeli at the Technion in Haifa, Israel. “Technology for Just-In-Time In-Situ Learning of Facial Affect for Persons Diagnosed with an Autism Spectrum Disorder.” July 2008.

Research Positions

MD/PhD student – Full-time Graduate Student

University of Massachusetts Medical School, Departments of Neurology and Anesthesiology, Worcester
Brown University, Department of Engineering, Providence, RI
(August 2014 – present)

Working with advisors at UMass Medical School (Dr. Matthias Walz, Associate Professor of Anesthesiology and Surgery, and Dr. Bob Brown, chair of Neurology) and at Brown University (Dr. Leigh Hochberg, Professor of Engineering) to develop a technology-based protocol for addressing the communicated needs of intubated ICU patients. Auditing courses on Critical Care Nursing and meeting with a variety of clinicians and researchers. Assembling and administering a survey for nurses on their perceptions of patient communication capabilities and needs.

UMass MD/PhD program - Summer Research Student

University of Massachusetts Medical School, Department of Neurology, Worcester;
SpeakYourMind Foundation, Providence, RI
(June 2013 – August 2013)

Spent time in multiple clinical settings to gain a broad understanding of the development of assistive communication technology for persons with severe physical disabilities impacting both movement and speech. Volunteered for the nonprofit SpeakYourMind Foundation to create and iterate on a possible design for a communication technology based on a wearable eye-tracking device. Wrote software in Processing, a Java-based language, to interpret the webcam data and allow a young woman who suffered severe brainstem stroke, to communicate with her family and caregivers via tracking of her eye movements. Engaged with other students to develop applications such as the FlashSpeller, in which a patient’s blink or eye movement would select first a group of letters and then a letter from within the group, in order to form words one letter at a time. Explored the implications of using different types of hardware and software and learned about the different types of parameters and adjustments that would be necessary for people with different types of impairments.

UMass MD/PhD program - Summer Research Student

Advanced Technology Team, Wyss Institute for Biologically Inspired Engineering, Boston

(June 2012 – July 2012)

Designed and programmed new features of an effort to allow 'playback' of EEG data recorded from hospitalized epileptic patients. Standardized the underlying components of and expanded on a LabView project using original Children's Hospital scalp EEG data from PhysioNet. Helped to design an intuitive user interface that could be accessed by non-technical users. Elucidated the technical and clinical goals of the project.

Master's of Engineering degree candidate [formerly Undergraduate Researcher]

Affective Computing Group, Media Laboratory, MIT

(September 2007 – August 2010)

Designed, administered, and analyzed results of novel behavioral intervention for autistic adolescents designed to introduce natural emotional expressions in a supportive learning environment. Designed and coded intuitive user interfaces for illustration of emotion state, using data derived from live video of facial expressions. Introduced user interfaces for testing in clinical/hospital settings with autistic and epileptic children. Explored strategies for seizure prediction using facial video of epileptic pediatric patients at Children's Hospital Boston.

Undergraduate Researcher, Robotics, Vision, and Sensor Networks Group

Computer Science and Artificial Intelligence Laboratory, MIT

(February 2009 – September 2009)

Acted as Clinical Coordinator for robotic wheelchair design project based at The Boston Home, a long-term residential facility for persons with late-stage multiple sclerosis and similar neurodegenerative conditions. Assisted with design of spoken interfaces. Coordinated and advised on design of wheelchair-tracking console for use by TBH nurses.

Undergraduate Researcher, Industrial Engineering

Israeli Institute of Technology (Technion), Haifa, Israel

Supported by the Paul E. Gray Endowed Fund for UROP. Jay M. Kogan MISTI-Israel intern.

(June – August 2008)

Developed innovative game for children with Asperger's syndrome to teach strategies for a decision-making task. Also held MISTI Reporter position: traveled around country, collecting stories and photographs about MIT students' internships.

Undergraduate Researcher with Voting Technology Project, Media Laboratory, MIT.

(October 2006 – May 2007)

Improved touch-screen ballot design using JAVA to enhance the quality of electronic voting for voters; created mock-ups of actual ballots using Flash for tests of whether undervoting is caused by poor ballot design. Collaborated with project team to use human interaction research results for making voting more intuitive; incorporated feedback from experiments to improve ballot quality and usability.

Undergraduate Researcher at Speech and Communications Laboratory, RLE, MIT.

(January–May 2006)

Created website for an Independent Activities Period linguistics course, "Transcribing Prosodic Structure of Spoken Utterances with ToBI": <http://anita.simmons.edu/~tobi> Analyzed speech hand-labeled according to context in sentence using Perl. Wrote programs designed to combine and generate speech labels.

Teaching Positions

Programming Instructor at Poly Prep Country Day School
(March 2013, March 2014)

Wrote and taught a one-afternoon programming class for female high school students covering the basics of Processing for information visualization.

Beginning and Intermediate Hebrew teacher at MIT's Hebrew Study Program (Ulpan).
(February 2009 – December 2010)

Prepared and taught a novel fast-paced curriculum on written and spoken beginning Hebrew.

Programming Teacher at the Winsor School. Boston, MA.
(September 2007 – June 2008)

Taught Processing to middle-school girls in popular afterschool program. Created curriculum, gave weekly lectures, organized assistant teaching staff, and maintained course website.

Programming Instructor in the MIT Computer Science Department.
(January 2008)

Wrote and taught a for-credit 16-hour course in Processing to MIT undergrads and grad students. Created curriculum, presented twice-weekly lectures, assigned & graded homework, and maintained course website. (In 2009, 2010, and 2011, taught four-hour crash courses on similar material.)

Other Employment

Software Developer at AthenaHealth, Watertown, MA.
(July 2011 – April 2012)

Evaluated and fixed bugs in the AthenaHealth electronic health record (EHR) web application, using Perl, JavaScript, and Oracle.

Assistive Technology Design Consultant, Cambridge, MA.
(June 2010 – May 2012)

Designed, created, tested, and deployed custom music-creating and communicative technology for a young man with cerebral palsy.

Designed and improved communication technology for a young man with quadriplegia.

Contractor with Affectiva, Inc., Waltham, MA.
(September 2010 – December 2010)

Worked with colleagues from MIT to develop better face-reading and emotion-predicting algorithms in order to improve treatment of persons with autism.

Science Intern with Domain Development Team. ChoiceStream, Inc. Cambridge, MA.
(June 2006 – March 2007, October 2008 – February 2009, August 2010 – March 2011)

Compiled initial information on client databases using SQL; incorporated information into data-viewing presentation, using data sets from client-to-customer solicitations. Collected & organized existing product hierarchy data to create internal taxonomy for new customer information.

Created novel visualizations of data to allow better understanding and manipulation of customer data.

Random Hall Residential Advisor, Cambridge, MA.

(June 2009 – August 2009)

Monitored dormitory residents, organized all-dormitory events, and served as dormitory liaison to student life organizations on campus.

Consultant with MIT International Science and Technology Internships program, Cambridge, MA.

(January 2009 – March 2009)

Evaluated website design and developed suggestions for user interface and student interest improvement. Compiled and edited publicity material from other students.

Collaboration Technologies Intern at the IBM Haifa Research Labs. Haifa, Israel.

(June – August 2007)

Worked with team members to create innovative Web 2.0-style plugin for IBM internal chat client to facilitate semi-persistent group communication about user queries. Designed and coded user interface for Java plugin; emphasized usability & efficiency for improved user experience.

Math test writer/reviewer at DemiDec. Los Angeles, CA (worked from MA).

(June 2006 – January 2007, June – August 2008.)

Wrote, edited, and reviewed math tests [through the beginning-calculus level] in Microsoft Word and MathType to prepare high school clients for the US Academic Decathlon.

Activities/Leadership

Founding member of UMass Physical Medicine & Rehabilitation Interest Group, March 2014-present.

Co-founder of UMass chapter of Students for a National Healthcare Program, January 2014-present.

First student member of the UMass Medical School Disabilities Subcommittee, December 2013-present.

Participant in pediatric-patient-oriented Sidekicks program, September 2013-August 2014.

Co-founder and organizer of UMass Medical School Amputee Group, August 2013-present.

Attendee and organizer of the UMass annual service trip to the Dominican Republic, March 2013.

Founding member of Bioethics Interest Group at UMass Medical School, October 2012-May 2014.

Founding member of Docapella, UMass Medical School student a cappella group, October 2014-May 2015.

Participant in NICU-based Cuddle Buddies program, September 2013-May 2015.

Member of Shir Joy community Jewish chorus, September 2012-May 2015.

Co-recipient of MLK Semester of Service Award for Worcester Free Clinics Spanish Interpreter Project, January 2013.

Participant in geriatrics-oriented Navigator Program, September 2012-June 2013.

Leader of JewMass (UMass Medical School Jewish student organization), September 2012-January 2014.

Bone Marrow Donor Registration Drive organizer and volunteer, University of Massachusetts Medical School, September 2012.

Bone Marrow Donor Registration Drive organizer and volunteer, University of Massachusetts Boston, September 2010-June 2011.

Volunteer webdesigner and consultant for the M. N. Adamov Fund for the Blind, which assists underserved blind persons in Russia, May 2010-June 2012. mnadamovfund.org

Volunteer webdesigner and consultant for the Central Yiddish Cooperative Organization (CYCO), the last Yiddish bookstore in New York, November 2010-June 2012. cycobooks.org

Bone marrow donor registration drive coordinator, blood drive volunteer coordinator, and webmaster for the Red Cross (MIT Chapter), June 2008-August 2010.

Tower Captain in MIT's Guild of Bellringers, May 2006-May 2008, and bellringer, 2005-present.

President of Techiya (MIT Jewish a cappella singing group) from January 2010-June 2010, and member, February 2007-August 2010.

Steering Committee member in Hibur (Technion/MIT collaboration organization), September 2008-June 2010.

Addir Interfaith Discussion Program member, May 2009-June 2010.

Hillel Vice-President for Shabbat and Holidays, February 2009-January 2010.

EECS dormitory representative, September 2007-August 2009.

Community Catalyst Fellow, 2008-2009.