

# Javier Hernandez

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USA Green Card Holder  
Spanish Citizenship

## Research Statement

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I am interested in developing tools with physiological intelligence that can foster greater health and quality of life as well as further the understanding of human beings. My research leverages techniques from Human Computer Interaction, Machine Learning, Computer Vision, and Psychophysiology

## Education

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### Massachusetts Institute of Technology, Cambridge, MA, USA

(09/2010 – 08/2015) Ph.D. in Media Arts and Sciences, GPA: 5/5  
Thesis: *“Towards Wearable Stress Measurement”*

### Carnegie Mellon University, Pittsburgh, PA, USA

(08/2008 – 05/2010) M.S. in Robotics and Artificial Intelligence, GPA: 3.95/4  
Thesis: *“Supervised Classification with Structured Instance Selection”*

### LaSalle, Ramon Llull University, Barcelona, Spain

(09/2004 – 06/2007) M.S. in Information Technology, GPA: 8.12/10  
Thesis: *“Learning Kernels for Support Vector Machine Classification”*

(09/2001 – 06/2004) B.S. in Computer Systems Engineering, GPA: 8.03/10

Thesis: *“Web Application Development for Human Resources Management”*

## Work Experience

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### The Media Lab at Massachusetts Institute of Technology, Cambridge, MA, USA

(08/2015 – Present) Research Scientist under Rosalind Picard in the Affective Computing group  
Work primarily focused on real-life stress measurement

### The Media Lab at Massachusetts Institute of Technology, Cambridge, MA, USA

(09/2010 – 08/2015) Research Assistant under Rosalind Picard in the Affective Computing group  
Work primarily focused on Affective Computing. Main projects involve:

- Automatic stress recognition in real-life settings
- Measuring the "mood" of a large scale settings through smiles
- Development of tools for behavioral and contextual annotation

### Microsoft Research, Redmond, WA, USA

(06/2013 – 09/2013) Intern under Asta Roseway in the Visualization and Interaction group  
Measuring the stress of computer users

(06/2012 – 09/2012) Intern under Zicheng Liu in the Multimedia, Interaction and Communication group  
Measuring the engagement of TV viewers

### Panafold, Inc., Palo Alto, CA, USA

(01/2012 – 01/2012) Design and development of mobile applications to promote learning of words

### **The Robotics Institute at Carnegie Mellon University, Pittsburgh, PA, USA**

(09/2008 – 05/2010) Collaborator in the research laboratories Human Sensing and Component Analysis

(10/2007 – 09/2009) Research Associate under Dr. Fernando De la Torre  
Work primarily focused on Computer Vision and Machine Learning

Examples of projects are:

- Automatic facial expression recognition
- Audio analytic system for gunshot detection

(09/2006 – 10/2007) Visiting Scholar under Dr. Fernando De la Torre  
Research and writing of the M.S. Information Technology thesis

### **Psychiatry and Epidemiology at University of Pittsburgh School of Medicine, Pittsburgh, PA**

(08/2007 – 05/2008) Research Assistant under Dr. Rebecca C. Thurston  
Automated measurement of physiological hot flashes in menopausal women

### **LaSalle, Ramon Llull University, Barcelona, Spain**

(09/2003 – 07/2004) Collaborator in the Research Group in Intelligent Systems  
Development and writing of the B.S. Computer Systems Engineering thesis

## **Languages**

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Native Spanish and Catalan  
Fluent reading, writing and speaking in English

## **Computer Skills**

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**Programming Languages:** MATLAB, JAVA, C, C++, PHP, HTML and JavaScript  
**Tools:** Android SDK, Bash (Unix shell), MySQL, Processing, L<sup>A</sup>T<sub>E</sub>X and Microsoft Office  
**Operating Systems:** Windows and Linux

## **Honors & Awards**

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(2016) Innovator under 35 by *MIT Technology Review*  
(2016) Honorable mention award for best paper at *MobileHCI*  
(2016) Honorable mention award for best paper at *Computer and Human Interaction Conference*  
(2015) Finalist of best student paper award at *Engineering in Medicine and Biology Society*  
(2015) Best poster award at *Body Sensor Networks*  
(2015) Finalist of best paper award at *PervasiveHealth*  
(2014) Finalist of the *MIT 100K Pitch* competition  
(2014) Best student paper award at *MobiHealth*  
(2013) Semifinalist of the *MIT 100K Launch* competition  
(2013) Winner of *Data Driven Hackathon* hosted by IDEO and Volkswagen  
(2012) Third position in the *Olympus Idea* competition  
(2012) One of the winners of the *Samsung Note Idea* competition  
(2011) *Council for the Arts at MIT (CAMIT)* award  
(2011) *Festival of Art, Science, and Technology (FAST)* award  
(2010) Invited to *Google GRAD CS Forum*  
(2009) Best poster award (Reading Faces with CRFs) CMU Machine Learning Class  
(2009) *Caja España Scholarship* for graduate studies (renounced)  
(2009-2011) *Caja Madrid Scholarship* for graduate studies

## Teaching & Talks

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- (11/2016) Presentation at *MIT Tech Review Under 35 (Spain)* - Using Technology to Combat Stress
- (09/2016) Presentation at *MobileHCI* - Wearable Experience Sampling
- (12/2015) Invited speaker by the Boston Consulting Group - Affective Computing & Healthcare
- (11/2015) Invited speaker in the Affective Brain Lab at MIT
- (11/2015) Guest lecturer in the MIT class MAS 630 - Affective Computing & Stress
- (11/2015) Guest lecturer in the Tufts class - Affective Interfaces
- (09/2015) Keynote speaker at *DRT4All* - Bringing Emotional Intelligence to Computers
- (08/2015) Presentation at *EMBC* - Measuring Physiological Parameters with Smartphones
- (05/2015) Presentation at *PervasiveHealth* - Measuring Motion-based Physiology from the Wrist
- (11/2014) Demo at *Always Connected - The Promise of Wearable Technology* at the MIT Museum
- (11/2014) Presentation at *MobiHealth* - Measuring Physiological Parameters with Google Glass
- (09/2014) Presentation at *Ubicomp* - Measuring Social Engagement of Children
- (04/2014) Presentation at *CHI* - Under Pressure: Sensing Stress of Computing Users
- (04/2014) Invited speaker in *Google Glass Workshop* - Measuring Daily Emotions with Google Glass
- (04/2014) Co-guest lecturer in the MIT class MAS.962 - Automated Emotion Measurement
- (02/2014) Guest lecturer in the MIT class MAS.500 - Emotion Recognition
- (11/2013) Guest lecturer in the MIT class MAS 630 - Emotion Measurement in Real-life Settings
- (04/2013) Presentation in *UbiComp* - Mood Meter: Counting Smiles in the Wild
- (04/2013) Presentation in *UbiComp* - AMA, an application for behavioral annotation
- (04/2013) Invited speaker in *InspireYale* at Yale University
- (11/2013) Invited speaker in Daniel's Gilbert group at Harvard University
- (10/2012) Presentation in *Engineering & Autism Workshop* - Multimodal Behavioral Annotation
- (04/2012) Invited speaker at *TEDxNewHaven* – MIT Mood Meter
- (05/2012) Autonomic Nervous System Workshop at the Comp. Behavior Science summer school
- (11/2011) Demo at *TEDxCambridge* – MIT Mood Meter
- (11/2011) Invited speaker in the *Center for Biological & Computational Learning* group at MIT
- (05/2011) Presentation in *ACII* - Call Center Stress Recognition with Person-Specific Models
- (10/2010) Guest lecturer in the MIT class MAS 622J - Dimensionality Reduction
- (09/2010) Teaching Assistant of the MIT class MAS 622J - Pattern Recognition and Analysis

## Supervised Undergraduates

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- (2015) Yang Chen (MIT)
- (2014-2015) Christian Infante (MIT)
- (2014) Shirley Chen (MIT)
- (2014) Descartes Holland (MIT)
- (2014) Alexandra J Erixson (MIT)
- (2014) Adrian Jimenez-Galindo (MIT)
- (2013) Dalitso Banda (MIT)
- (2011) Will Drevo (MIT)
- (2011) Lakshmi Parthasarathy (Harvard University)

## Outside Activities & Service

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- (2017) Reviewer at *Human Factors in Computing Systems*
- (2016) Program Committee Member of *MindCare*
- (2016) Reviewer at *Transactions on Biomedical Engineering, Translational Engineering in Health and Medicine, Emotion Review, Journal of Sensors and Human Factors in Computing Systems*
- (2015) Reviewer at *Ubiquitous Computing and Human Factors in Computing Systems*
- (2014) Reviewer at *Pervasive and Mobile Computing*
- (2014) Program Committee Member of the *Work-in-progress Human Factors in Computing Systems*

- (2014) Catalyst for *M+Vision IDEA<sup>2</sup> Madrid* program
- (2013) President of the MIT graduate dorm *The Warehouse*
- (2013) Reviewer at *Pervasive and Mobile Computing*
- (2012) Technology officer of the MIT graduate dorm *The Warehouse*
- (2012) Reviewer at *Affective Computing and Pervasive*
- (2011) Reviewer at *Medical & Biological Engineering & Computing*







## Patents & Provisionals

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- (01/2015) Hernandez J., McDuff, D., Picard R. W. Estimation of Physiological Parameters from Motion of a Mobile Computing Device, US20160007935, MIT
- (03/2014) Hernandez J., Li Y., Regh J., Picard R. W. Methods and Apparatus for Physiological Parameter Estimation, US14661747, MIT and Georgia Institute of Technology
- (02/2014) Hernandez J., Roseway A., Czerwinski M., Paredes P., Choi D. Weniger, User Stress Detection and Mitigation, US20150297140, Microsoft
- (04/2013) Hernandez J., Liu Z., Hulten G., Conrad M., Krum K., DeBarr D. Zhang Z., Estimating Engagement of Consumers Of Presented Content, US20130232515, Microsoft
- (07/2012) Hernandez J., Hoque E., Picard R. W. Methods and Apparatus for Smile Analytics, US61676968, MIT

## Publications

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-  Hernandez, J., McDuff, D., Infante, C., Maes, P., Quigley, K., and Picard, R. W. **Wearable ESM: Comparing the Wearable Experience Sampling Method across Wearable Devices.** In Proceedings of *Mobile Human Computer Interaction*, 2016
-  McDuff, D., Hernandez, J., Gontarek, S., and Picard, R. W. **COGCAM: Contact-free Measurement of Cognitive Stress during Computer Tasks with a Digital Camera.** In Proceedings of the *Computer and Human Interaction Conference*, 2016
-  Hernandez, J., McDuff, D., and Picard, R. W. **BioPhone: Physiology Monitoring from Peripheral Smartphone Motions.** In the Proceedings of *Engineering in Medicine and Biology Society*, 2015
-  Hernandez, J., McDuff, D., and Picard, R. W. **BioInsights: Extracting Personal Data from "Still" Wearable Motion Sensors.** In the Proceedings of *Body Sensor Networks*, 2015
-  Hernandez, J., McDuff, D., and Picard, R. W. **BioWatch: Estimation of Heart and Breathing Rates from Wrist Motions.** In the Proceedings of *Pervasive Health*, 2015
- Hernandez, J., Li, Y., Rehg, J. and Picard, R. W. **Cardiac and Respiratory Parameter Estimation Using Head-mounted Motion-sensitive Sensors.** In *EAI Endorsed Transactions on Pervasive Health and Technology, Special Issue on Mobile and Wireless Technologies for Healthcare*, 2015
-  Hernandez J., Li Y., Rehg J., and Picard R. W. **BioGlass: Physiological Parameter Estimation Using a Head-mounted Wearable Device.** In International Conference on *Wireless Mobile Communication and Healthcare*, 2014
- Hernandez J., and Picard R. W. **SenseGlass: Using Google Glass to Sense Daily Emotions.** In *ACM User Interface Software and Technology Symposium*, 2014
- Hernandez J., Riobo I., Rozga A., Abowd G. D., Picard R. W. **Using Electrodermal Activity to Recognize Ease of Engagement in Children during Social Interactions.** In International Conference on *Ubiquitous Computing*, 2014
- Hernandez J., McDuff D., Benavides X., Amores J., Maes P., and Picard R. W. **AutoEmotive: Bringing Empathy to the Driving Experience to Manage Stress.** Provocative work in *Designing Interactive Systems*, 2014

Paredes P., Gilad-Bachrach R., Czerwinski M., Roseway A., Rowan K., and Hernandez J. **PopTherapy: Coping with Stress through Pop-Culture.** In Conf. on *Pervasive Technologies for Healthcare*, 2014

Hernandez J., Riobo I., Rozga A., Abowd G. D., and Picard R. W. **How Easy Are Children to Engage during Child-Adult Play? Using Electrodermal Activity as Identifier.** In the Extended Abstract of *International Meeting for Autism Research*, 2014

Riobo I., Parnami A., Hernandez J., and Abowd G. D. **G.L.I.M.: Glass Live Interaction Monitor Live Internal State Interaction Monitor using Google Glass + EDA.** In the Extended Abstract of *International Meeting for Autism Research*, 2014

Hernandez J., Paredes P., Roseway A., and Czerwinski M. **Under Pressure: Sensing Stress of Computing Users.** In *Computer and Human Interaction* conference, 2014

Zisook M., Hernandez J., Goodwin M.S., and Picard R. W. **Enabling Visual Exploration of Long-term Physiological Data.** In IEEE Conference on *Visual Analytics Science and Technology*, 2013

Hernandez J., Sano A., Zisook M., Deprey J., Goodwin M., and Picard R. W. **Analysis and Visualization of Longitudinal Physiological Data of Children with ASD.** In the Extended Abstract of *International Meeting for Autism Research*, 2013

Hernandez J., Zicheng L., Hulten G., DeBarr D., Krum K., and Zhang Z. **Measuring the Engagement Level of TV Viewers.** In the IEEE International Conference on *Automatic Face and Gesture Recognition*, 2013

Hernandez J., McDuff D., Fletcher R., and Picard, R. W. **Inside-Out: Reflecting on your Inner State.** Work-in-progress in *Pervasive Computing*, 2013

Hernandez J., Hoque M. H., Drevo W., and Picard, R. W. **Mood Meter: Counting Smiles in the Wild.** In Proceedings of the International Conference on *Ubiquitous Computing*, 2012

Hernandez J., Sano A., Deprey J., Eckhardt M., Goodwin M.S., and Picard, R.W. **Multimodal Annotation Tool for Challenging Behaviors in People with Autism Spectrum Disorders.** Workshop on *Ubiquitous Mobile Instrumentation at the International Conference on Ubiquitous Computing*, 2012

Hernandez J., Hoque M. E., and Picard R. W. **Mood Meter: Large-Scale and Long-Term Smile Monitoring System.** In the *ACM SIGGRAPH Emerging Technologies*, 2012

Hernandez J., Sano A., Goodwin M. S., and Picard R. W. **AMA, an application for Annotation, Monitoring, and Analysis of behavioral activity.** In the Extended Abstract of the *International Meeting for Autism Research*, 2012

Ayzenberg Y., Hernandez J., and Picard R. W. **FEEL: Frequent EDA and Event Logging, a Mobile Social Interaction Stress Monitoring System.** In the Extended Abstract of *Computer Human Interaction*, 2012

Hernandez J., Morris R., and Picard R. W. **Call Center Stress Recognition with Person-Specific Models.** In Proceedings of the *Affective Computing and Intelligent Interaction*, 2011

Thurston R., Hernandez J., Del Rio J., and De la Torre F. **Support Vector Machines to Improve Physiologic Hot Flash Measures: Applications to the Ambulatory Setting.** In Journal of the *Society for Psychophysiological Research*, 2011

Hernandez J., Harchaoui Z., and De la Torre F. **Instance-selecting Regularization Penalty for Supervised Image Classification.** Carnegie Mellon University Technical Report CMU-RI-TR-10-42, 2010

Thurston R., Karen K., Hernandez J., and De la Torre F. **Improving the Performance of Physiologic Hot Flash Measures with Support Vector Machines.** In Journal of the Society for *Psychophysiological Research*, 2009

## Selected Press

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**Javier Hernandez's intelligent devices detect stress and emotions to help people**, by Laura Crespo, *MIT Tech Review*, October 13, 2016

**Track Your Heart with Your Phone**, by Rachel Metz, *MIT Tech Review*, November 11, 2015

**Javier Hernandez, investigador del MIT Especialista en Computación Afectiva, protagoniza SER Capaces**, *Cadena SER*, September 25, 2015

**Shifting Identity**, by Matt Kaplan, *The Economist*, June 18, 2015

**Daily Planet**, by Lucas Cochran, *Discovery Channel*, December 18, 2014

**Crean Aplicación para Google Glass Capaz de Determinar el Nivel de Estrés**, *El Mercurio*, September 8, 2014

**Crowd Control: The DMV... Your Happy Place?** by Daniel Pink, *National Geographic*, November 24, 2014

**Stressed, Forgetful, Autistic May Find Hope Looking to Google Glass**, MIT Media Lab. by Aneri Pattani, *Cambridge Day*, November 18, 2014

**Creating Machines with Empathy**, by George Voulgaris, *Tech Talks Central*, November 15, 2014

**Google Glass Can Now Track Your Stress Level**, by Rachel Metz, *MIT Technology Review*, September 5, 2014

**Google Glass, Now in Tune with Your Emotions**, by Hal Hodson, *NewScientist*, September 4, 2014

**Researchers Turn Google Glass into Health Sensor**, by Madhumita Venkataramanan, *WIRED UK*, September 4, 2014

**El Teclado y El Ratón de Tu Ordenador Sufren y Saben Tu Estrés**, by Miguel Angel Criado, *The Huffington Post*, May 19, 2014

**Rise of the Machines that Read Your Mind**, *The Times*, May 8, 2014

**Devices that Know How We Really Feel**, by Nick Bilton, *The New York Times*, May 4, 2014

**Feeling Glum, Happy, Aroused? New Technology Can Detect Your Mood**, by Kieron Monks, *CNN*, February 5, 2014

**Lifelogger Reveals the Day's Emotional Highs and Lows**, by Adam Becker, *NewScientist*, May 24, 2013

**Computers Scan a Crowd, Gauging Its Mood**, by John Pavlus, *FastCompany*, June 29, 2012

**MIT Meter Measures the Mood of Passers-By**, by Susannah F. Locke, *Popular Science*, Nov. 10, 2011

**Photo Essay: Furry Robots, Foldable Cars and More Innovations from MIT's Media Lab**, *PBS Newshour*, May 20, 2011

**Smile, MIT! You're on the Mood Meter**, by Laura Stilwell, *The Tech*, May 6, 2011

**Eye in the Sky: MIT's Mood Meter is Watching You - Smile!** by Gregory Gomer, *BostInnovation*, April 25, 2011

**Mood Meter, a Creation of MIT Media Lab, Measures Facial Expressions from a Public Video Feed**, *The Tech*, April 15, 2011

## References

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Available upon request