# Julian RAMOS

## Summary

**I'm a research scientist working at the intersection of Artificial intelligence and research with human-subjects on multidisciplinary projects**. My work spans from machine learning to detect nuclear threats, to the development of methods for the automatic adaptation of mobile health interventions optimizing for preference and health outcomes using **wearables**, **human-feedback** and **reinforcement learning**. I enjoy working on challenging problems in sensing, applied AI and data-analysis.

## Education

**Carnegie Mellon University**                                                          *Pittsburgh, PA, USA*
Ph.D. in Computer Science
Dissertation title: Exploring AI-based personalization of a mobile health intervention and its effects on       *Aug. 2015 - May. 2021*
behavior change, motivation, and adherence

**Carnegie Mellon University**                                                          *Pittsburgh, PA, USA*
M.Sc. in Human-computer Interaction                                                      *Aug. 2015 - Aug. 2019*

**Universidad Militar Nueva Granada**                                                    *Bogota, Colombia*
B.Eng. in Mechatronics Engineering                                                       *Aug. 2000 - Aug. 2006*

## Honors & Awards

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|---|---|---|
| **Smart and connected health student travel award,** National Science Foundation | *Alexandria, VA* | 2020 |
| **Future Faculty Career Exploration Program,** Rochester Institute of Technology | *Rochester, NY* | 2019 |
| **Microsoft Dissertation Grant,** Microsoft Research | *Redmond, WA* | 2019 |
| **Interdisciplinary summit on the foundations of data science,** ACM-IMS | *San Francisco, CA* | 2019 |
| **Center for Machine Learning and Health Fellowship,** Pittsburgh Health Data Alliance | *Pittsburgh, PA* | 2017 |
| **Best paper award,** ACM Ubicomp | *Heidelberg, Germany* | 2016 |
| **Facebook fellowship finalist,** Facebook | *Menlo Park,CA* | 2016 |
| **Honorable Mention (Best paper nominee),** IEEE Percom | *St. Louis, MI* | 2015 |
| **2nd Place,** EVAAL 2nd Competition - Activity recognition track | *Madrid, Spain* | 2012 |
| **Summer Scholar,** Robotics Institute Summer Scholar Program, Carnegie Mellon University | *Pittsburgh, PA* | 2008 |
| **Young Researcher Fellowship,** Universidad Militar Nueva Granada | *Bogota, Colombia* | 2007 |
| **2nd Place,** Programming Marathon, Universidad Militar Nueva Granada | *Bogota, Colombia* | 2006 |
| **1st Place,** Robotics Challenge, School of Engineering, Universidad Militar Nueva Granada | *Bogota, Colombia* | 2005 |

## Publications (Peer reviewed Conferences and Journal Articles)

[20] Julian **Ramos**, Steven Dang, Rushil Khurana, Mayank Goel, and Anind K Dey. Sleepu: Exploring the personalization of content and timing of treatment using wearables, human-feedback and artificial intelligence. In ***Submission Ubicomp 2021**, draft **(link)***, 2021

[19] Julian **Ramos**, Johana Rosas, Shen Yilin, Jin Hongxia, and Anind Dey. Activity recommendation: Optimizing life in the long term. In *2020 IEEE International Conference on Pervasive Computing and Communications (PerCom)*, pages 1–10, 2020

[18] Sha Zhao, Shijian Li, Julian **Ramos**, Zhiling Luo, Ziwen Jiang, Anind K Dey, and Gang Pan. User profiling from their use of smartphone applications: A survey. *Pervasive and Mobile Computing*, 59:101052, 2019

[17] Sha Zhao, Julian **Ramos**, Jianrong Tao, Ziwen Jiang, Shijian Li, Zhaohui Wu, Gang Pan, and Anind K Dey. Who are the smartphone users? identifying user groups with apps usage behaviors. *GetMobile: Mobile Computing and Communications*, 21(2):31–34, 2017

[16] Julian **Ramos**, Mary Beth Kery, Stephanie Rosenthal, and Anind Dey. Sampling techniques to improve big data exploration. In *2017 IEEE 7th symposium on large data analysis and visualization (LDAV)*, pages 26–35. IEEE, 2017

[15] Nikola Banovic, Anqi Wang, Yanfeng Jin, Christie Chang, Julian **Ramos**, Anind Dey, and Jennifer Mankoff. Leveraging human routine models to detect and generate human behaviors. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pages 6683–6694, 2017

[14] Julian **Ramos**, Zhen Li, Johana Rosas, Nikola Banovic, Jennifer Mankoff, and Anind Dey. Keyboard surface interaction: A cheap and fast proof-of-concept prototype for finger tracking and pointing. *In submission to ISS 2021*, 2021

[13] Hongyi Wen, Julian **Ramos**, and Anind K Dey. Serendipity: Finger gesture recognition using an off-the-shelf smartwatch. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pages 3847–3851, 2016

[12] 🏆 Sha Zhao, Julian **Ramos**, Jianrong Tao, Ziwen Jiang, Shijian Li, Zhaohui Wu, Gang Pan, and Anind K Dey. Discovering different kinds of smartphone users through their application usage behaviors. In *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing*, pages 498–509, 2016

[11] Tadashi Okoshi, Hiroki Nozaki, Jin Nakazawa, Hideyuki Tokuda, Julian **Ramos**, and Anind K Dey. Towards attention-aware adaptive notification on smart phones. *Pervasive and Mobile Computing*, 26:17–34, 2016

[10] Tadashi Okoshi, Julian **Ramos**, Hiroki Nozaki, Jin Nakazawa, Anind K Dey, and Hideyuki Tokuda. Reducing users' perceived mental effort due to interruptive notifications in multi-device mobile environments. In *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing*, pages 475–486, 2015

[9] ⌛ Tadashi Okoshi, Julian **Ramos**, Hiroki Nozaki, Jin Nakazawa, Anind K Dey, and Hideyuki Tokuda. Attelia: Reducing user's cognitive load due to interruptive notifications on smart phones. In *2015 IEEE International Conference on Pervasive Computing and Communications (PerCom)*, pages 96–104. IEEE, 2015

[8] Jin-Hyuk Hong, Julian **Ramos**, and Anind K Dey. Toward personalized activity recognition systems with a semipopulation approach. *IEEE Transactions on Human-Machine Systems*, 46(1):101–112, 2015

[7] Hristijan Gjoreski, Simon Kozina, Matjaz Gams, Mitja Lustrek, Juan Antonio Álvarez-García, Jin-Hyuk Hong, Julian **Ramos**, Anind K Dey, Maurizio Bocca, and Neal Patwari. Competitive live evaluations of activity-recognition systems. *IEEE Pervasive Computing*, 14(1):70–77, 2015

[6] Julian **Ramos**, Jin-Hyuk Hong, and Anind K Dey. Stress recognition-a step outside the lab. In *International Conference on Physiological Computing Systems*, volume 2, pages 107–118. SCITEPRESS, 2014

[5] ⌛ Jin-Hyuk Hong, Julian **Ramos**, Choonsung Shin, and Anind K Dey. An activity recognition system for ambient assisted living environments. In *International Competition on Evaluating AAL Systems Through Competitive Benchmarking*, pages 148–158. Springer, 2012

[4] Jin-Hyuk Hong, Julian **Ramos**, and Anind K Dey. Understanding physiological responses to stressors during physical activity. In *Proceedings of the 2012 ACM conference on ubiquitous computing*, pages 270–279, 2012

[3] Anind K Dey, Katarzyna Wac, Denzil Ferreira, Kevin Tassini, Jin-Hyuk Hong, and Julian **Ramos**. Getting closer: an empirical investigation of the proximity of user to their smart phones. In *Proceedings of the 13th international conference on Ubiquitous computing*, pages 163–172, 2011

[2] Julian **Ramos**, Sajid Siddiqi, Artur Dubrawski, Geoffrey Gordon, and Abhishek Sharma. Automatic state discovery for unstructured audio scene classification. In *2010 IEEE International Conference on Acoustics, Speech and Signal Processing*, pages 2154–2157. IEEE, 2010

[1] Julian **Ramos**, Mauricio Sarmiento, and Watson Escobar. Reconocimiento de patrones en un arreglo sensórico usando redes neuronales. *Ciencia e Ingeniería Neogranadina*, 17(1):95–111, 2007

## Experience

**Samsung Research America - Artificial Intelligence Center**  *Mountain View,CA*

Supervisor - Ph.D. Yilin Shen
*May. 2016 - Aug. 2016*
Research Intern
- Developed a reinforcement learning method to estimate long term rewards of activities of daily living from behavioral logs (e.g., sleep, steps, positive affect).

**Carnegie Mellon University - Human-computer Interaction Institute**  *Pittsburgh,PA*

Ubicomp Lab, Supervisor - Ph.D. Anind Dey
*Jul. 2010 - Jul. 2015*
Research Programmer
- Stress recognition from physiological signals
- Activity recognition from accelerometer data.
- Built a prototype that transforms the keyboard's surface into a touchpad.
- Using phone sensor data, built a classifier that detects if the user is likely to click or not a on notification.

**Carnegie Mellon University - Robotics Institute**  *Pittsburgh,PA*

AutonLab, Supervisor - Ph.D. Arthur Dubrawski
*Jul. 2009 - Jul. 2010*
Research Programmer
- Nuclear threats detection using random forests (Collaboration with the Lawrence Livermore National Lab).
- Loggerhead turtle's nest localization from ground penetrating radar(GDPR) data (Sponsored by Disney resorts Florida).

**Carnegie Mellon University - Machine Learning Department**  *Pittsburgh,PA*

AutonLab, Supervisors - Ph.D Geoff Gordon, Ph.D. Arthur Dubrawski
*Feb. 2009 - May. 2009*
Research Visitor
- Implementation and testing of a C++ API for audio recognition using HMMs.
- Nuclear threats detection using random forests (Collaboration with the Lawrence Livermore National Lab).

**Carnegie Mellon University - Robotics Institute**  *Pittsburgh,PA*

SELECT Lab, Supervisor - Ph.D. Geoff Gordon
*Jun. 2008 - Sep. 2008*
Summer Scholar
- Developed a driver for a stereo camera in the Carnegie Mellon Robotics Navigation Toolkit (CARMEN).

**Universidad Militar Nueva Granada - School of Engineering**

COMPLEX PARTICULATE SYSTEMS LAB, SUPERVISOR - PH.D. WATSON L. VARGAS
YOUNG RESEARCHER FELLOWSHIP

*Bogota, Colombia*

*Jan. 2007 - Dec. 2008*

- Implementation (hardware and software) of a robot for odor source localization.

**Universidad Militar Nueva Granada - School of Engineering**

COMPLEX PARTICULATE SYSTEMS LAB, SUPERVISOR - PH.D. WATSON L. VARGAS
RESEARCH ASSISTANT

*Bogota, Colombia*

*Aug. 2006 - Dec. 2006*

- Design and implementation (hardware and software) of a system for odor recognition using Neural Networks.
- Design (hardware and software) of a robot for odor source localization.

## Teaching Experience

**Carnegie Mellon University - Human-computer Interaction Institute**

PROGRAMMING USABLE INTERFACES

*Pittsburgh, PA*

*Spring 2020*

**Carnegie Mellon University - Human-computer Interaction Institute**

USER CENTERED RESEARCH AND EVALUATION

*Pittsburgh, PA*

*Spring 2019*

## Invited Talks

**University of Michigan -Computer Science and Engineering Seminar**

MOBILE HEALTH APPROACHES TO PRECISION MEDICINE

*Ann Arbor,MI*

*Nov. 2020*

**Dartmouth Geisel School of Medicine - Center for Technology and Behavioral Health Seminar**

PERSONALIZING TIME OF TREATMENT AND CONTENT IN A SLEEP INTERVENTION USING SENSORS, HUMAN-FEEDBACK AND AI

*Lebanon,NH*

*Nov. 2020*

**Carnegie Mellon University - Programmable User Interfaces, Guest Lecture**

PERSONALIZING HEALTH INTERVENTIONS USING AI AND HUMAN FEEDBACK

*Pittsburgh,PA*

*Apr. 2020*

**Carnegie Mellon University - Human-AI interaction, Guest Lecture**

AI FOR MOBILE HEALTH INTERVENTIONS

*Pittsburgh,PA*

*Oct. 2019*

**Carnegie Mellon University - Mobile Sensing + Health Institute Seminar**

SLEEPU: EFFECTS OF A CONTEXT-BASED PERSONALIZED SLEEP HEALTH INTERVENTION FOR COLLEGE STUDENTS

*Pittsburgh,PA*

*Oct. 2019*

**Rochester Institute of Technology - Golisano College of Computing Colloquium**

SLEEPU: EFFECTS OF A CONTEXT-BASED PERSONALIZED SLEEP HEALTH INTERVENTION FOR COLLEGE STUDENTS

*Rochester,NY*

*Sep. 2019*

## Media Coverage

| | |
|---|---|
| **Microsoft Dissertation Grant ,** Microsoft Research Blog | 2019 |
| **Meet the CMLH Fellows ,** CMU SCS News | 2017 |
| **How to Operate Your Smart Watch with the Same Hand That Wears It ,** MIT Technology review | 2016 |

## Students Mentored

| | |
|---|---|
| **Uma Pradeepan,** Undergraduate Student, Carnegie Mellon University | 2019 |
| **Varshini Selvadurai,** Undergraduate Student, Carnegie Mellon University | 2019 |
| **Carolyn Zhong ,** Undergraduate Student, Carnegie Mellon University | 2019 |
| **Elizabeth La,** Undergraduate Student, Carnegie Mellon University | 2019 |
| **Yun-Chun Liu,** Masters Student - Human-computer interaction, Carnegie Mellon University | 2019 |
| **Qian Wang,** Undergraduate Student - visitor, Tsinghua University | 2017 |
| **Hongyi Wen,** Undergraduate Student - visitor, Tsinghua University, China | 2015 |
| **Ben Solecki,** Masters Student - Information Technology, Carnegie Mellon University | 2014 |
| **Zhen Li,** Undergraduate Student - visitor, Tsinghua University | 2014 |

## Service

**Representative in the School of Computer Science Diversity, Equity and Inclusion committee**, Representative of the Ph.D. students at the SCS-DEI meetings

2020

**Mentor in the CMU-AI Mentoring program,** Meet monthly with undergraduate students from underrepresented groups in computer science with the goal of involving them in research in AI within CMU

2020

**Ph.D. advisory committee School of Computer Science ,** Lead a team investigating ways to improve and adapt the Ph.D. students evaluation to the 2020 pandemic

2019-2020

**Reviewer,** Ubicomp, CHI, UIST, and IEEE Transactions on Systems, Machine and Cybernetics

2015-2020

**Sports organizer ,** Organized sport and recreational activities (e.g., soccer, basketball, volleyball)

2015-2016

## Skills

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|---|---|
| **Reinforcement Learning** | Q-Learning, Double Q-Learning, Bandits |
| **Supervised learning** | HMMs, Probabilistic Graphical Models, Deep Learning (ConvNets, LSTM) |
| **Unsupervised learning** | HMMs, Spectral clustering, Autoencoders |
| **Natural language processing** | Latent Dirichlet Allocation, Latent Semantic Analysis, word2vec, BERT |
| **Python - Data analysis - Modeling** | Tensorflow, keras, scikit-learn, pandas, seaborn |
| **R - Data analysis -Modeling** | ggeffects,lme4 (Mixed-Models), ARTool |
| **Programming** | Python, Java (Android), latex, Weka, MySQL, SQLite, Git/GitHub |
| **Languages** | Spanish(Native), English(Native) |

## Prototypes

- Pointing device using hand and fingers tracking with two webcams
- Pointing device using infrared trackers and Wii-Remotes
- System for live activity recognition using Smartphone and Wii-Remote accelerometers
- Robot for localization of odor sources
- Sensor System for detection of organic volatile compounds: Software, Data acquisition Board, Gas sensing validation bank and Gas sensor module.
- Dipping device for deposition of polymers
- Scale RC Hovercraft

## Relevant Coursework

| | | |
|---|---|---|
| Deep Reinforcement Learning (10703) | Applied Research Methods | Regression Analysis (70208) |
| Statistical Techniques in Robotics (16831) | Machine Learning (10701) | Concepts of Mathematics (21-127) |
| Graduate Artificial Intelligence (15780) | Intermediate Statistics (10705) | Introduction to Statistical Inference (36226) |
| User centered research | Robot Motion Planning (16735) | Introduction to Probability Theory (36225) |

References available upon request