Szymon Fedor

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PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology, Media Lab   **Cambridge, USA**
University of Cambridge, Computer Laboratory   **Cambridge, UK**
[May 2014-Present] Research Scientist

- Carried out research focused on development of non-invasive biomarkers of depression using wearable devices
- Developed together with academic (Harvard, MIT) and medical partners (Massachusetts General Hospital, Bingham and Women Hospital) 4 clinical protocols
- Negotiated study terms with funding organizations and industrial partners
- Managed several clinical (co-PI) studies where over 200 people with different types of depression were monitored 24/7
- Applied statistical and Machine Learning methods to analyze multimodal signals
- Supervised PhD students and undergraduates

United Technologies Research Center   **Cork, Ireland**
[Oct 2011 – May 2014] Research Team Leader

- Lead research group working on the projects from the Internet of Things, Wireless Sensor Networks and data analytics domains.
- Developed the concept of the next generation UTC building and home management products based on Internet of Things architecture.
- Researched new distributed, over-the-air reprogramming method for WSN based on RESTful architecture.
- Collaborated with leading European universities and industrial research groups.
- Supervised PhD interns and mentored postdocs working on a contract.
- Contributed to successful national and EU FP7 project proposals and working on the SCUBA and SPARKS projects.
- Published journal/conference publications, patent proposals.
- Represented UTC at the IPSO alliance.

Ericsson Research   **Dublin, Ireland**
[Feb 2008 – Sept 2011] Senior Researcher

- Lead research group responsible for design, implementation and tests of the WSN service platform prototype (providing network and information management services to enable reliable and accurate context information retrieval and interaction with the physical environment) used by various Ericsson Research partners. The team submitted 4 patens and 3 peer reviewed publications.
- Actively participated in EU FP7 projects SENSEI and PROSENSE. Coordinated the research cooperation with CLARITY centre.
- Prepared proposals for internal research projects. Supervised research interns.
- Provided input for the standardisation 3GPP and ETSI comities.
- Published journal/conference publications and patent proposals.

Massachusetts Institute of Technology, Media Lab   **Cambridge, USA**
[Oct 2010-Feb 2011] Visiting Scientist,

- Analysed large volumes of physiological measurements from body sensor networks using machine learning techniques to identify patterns with the aim of improving personal health.
- Lead a project where pattern classification techniques were used to compare different sites for skin conductance measurement.
- Attended a M.Sc. Machine Learning course.

EDUCATION

Dublin City University   **Dublin, Ireland**
[Sept 2004-Feb 2008] Ph.D. School of Electronic Engineering, Thesis: *Cross-layer optimization of routing protocols in Wireless Sensor Networks.*
Dublin City University   **Dublin, Ireland**
[Sept 2003 – Sept 2004] M.Eng. in Telecommunications Engineering with First Class Honours, Thesis: *Location and tracking of mobile users in a wireless system*
National Institute of Applied Sciences (INSA)   **Lyon, France**
[Sept 1999 – Sept 2004] Diplôme d'ingénieur (equivalent to M.Sc), Département Télécommunications, Thesis: *Adaptation and evaluation of IP protocol on the SDH network.*

PUBLICATIONS - BOOK/CHAPTERS

- Sensor Network Integration Frameworks, Book chapter, *Application and Multidisciplinary Aspects of Wireless Sensor Networks,* Springer 2010, ISBN: 9781849965095
- Energy optimization of protocols in Wireless Sensor Network: Novel cross-layer techniques to expand system lifetime, Book, LAP Lambert Academic Publishing, November 2009, ISBN-10: 3838324536

PUBLICATIONS - JOURNAL

- Picard, R. W., Fedor, S., & Ayzenberg Y., Response to Commentaries on "Multiple Arousal Theory and Daily-Life Electrodermal Activity Asymmetry" Emotion Review, March 2015.
- Picard, R. W., Fedor, S., & Ayzenberg Y., "Multiple Arousal Theory and Daily-Life Electrodermal Activity Asymmetry" *Emotion Review*, March 2015.
- Villaverde, B. C., de Paz Alberola, R., Jara, A. J., Fedor, S., Das, S. K., & Pesch, D. "Service Discovery Protocols for Constrained Machine-to-Machine Communications." *Communications Surveys & Tutorials, IEEE* 16.1 (2014): 41-60.
- Fedor, Szymon, Martin Collier, and Cormac J. Sreenan. "Cross-layer routing and time synchronisation in wireless sensor networks." *International Journal of Sensor Networks* 10.3 (2011): 143-159.

PUBLICATIONS - CONFERENCE

- Xia, V., Jaques, N., Taylor, S., Fedor, S., and Picard, R. "Active Learning for Electrodermal Activity Classification" In Proc. IEEE Signal Processing in Medicine and Biology Symposium, Philadelphia, Pennsylvania, December 2015.
- Chen, W., Jaques, N., Taylor, S., Sano, A., Fedor, S., and Picard, R. "Wavelet-Based Motion Artifact Removal for Electrodermal Activity" In Proc. International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Milan, Italy, August 2015.
- Taylor, S., Jaques, N., Chen, W., Fedor, S., Sano, A., and Picard, R. "Automatic Identification of Artifacts in Electrodermal Activity Data" In Proc. International

Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Milan, Italy, August 2015.

- Angeles Serna, Marian, Cormac J. Sreenan and Szymon Fedor. "A Visual Programming Framework for Wireless Sensor Networks in Smart Home Applications." Accepted for IEEE ISSNIP 2015.
- Bocchino, Stefano, Szymon Fedor, and Matteo Petracca. "PyFUNS: A Python Framework for Ubiquitous Networked Sensors." *Wireless Sensor Networks*. Springer International Publishing, 2015. 1-18.
- Hossain, A. K. M., Cormac J. Sreenan, and Szymon Fedor. "A Neighbour Disjoint Multipath Scheme for Fault Tolerant Wireless Sensor Networks." *Distributed Computing in Sensor Systems (DCOSS), 2014 IEEE International Conference on*. IEEE, 2014.
- Pacull, F., Ducreux, L. F., Thior, S., Moner, H., Pusceddu, D., Yaakoubi, O., Guyon-Gardeux, C.,Fedor, S., Lesecq, S., Boubekeur, M. & Pesch, D. "Self-organisation for building automation systems: Middleware linc as an integration tool." *Industrial Electronics Society, IECON 2013-39th Annual Conference of the IEEE*. IEEE, 2013.
- Villaverde, B. C., Pesch, D., De Paz Alberola, R., Fedor, S., & Boubekeur, M. "Constrained application protocol for low power embedded networks: A survey." *Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS), 2012 Sixth International Conference on*. IEEE, 2012.
- Handurukande, S., Fedor, S., Wallin, S., & Zach, M. "Magneto approach to QoS monitoring."*Integrated Network Management (IM), 2011 IFIP/IEEE International Symposium on*. IEEE, 2011.
- Fedor, Szymon, and Liam Fallon. "A method of automatic assessment of feature compatibility in mobile networks." *Wireless Telecommunications Symposium (WTS), 2010*. IEEE, 2010.
- Fedor, Szymon, and Martin Collier. "Synchronization service integrated into routing layer in wireless sensor networks." *Wireless Communications and Networking Conference, 2008. WCNC 2008. IEEE*. IEEE, 2008.
- O'Rourke, Damien, et al. "Reception region characterisation using a 2.4 GHz direct sequence spread spectrum radio." *Proceedings of the 4th workshop on Embedded networked sensors*. ACM, 2007.
- Fedor, Szymon, and Martin Collier. "On the problem of energy efficiency of multi-hop vs one-hop routing in Wireless Sensor Networks." *Advanced Information Networking and Applications Workshops, 2007, AINAW'07. 21st International Conference on*. Vol. 2. IEEE, 2007.
- Fedor, Szymon and Collier, Martin "Cross-Layer Routing with Data Delivery Guarantee in Wireless Sensor Networks," ACM Workshop on Real-World Wireless Sensor Networks, REALWSN'06, Uppsala, Sweden, June 19, 2006.
- Fedor, Szymon and Collier, Martin "An Intra-cluster Architecture to Prolong Wireless Sensor Network Lifetime", Proc. IEEE SoftCOM'05, Split, Croatia, Sept. 15-17, 2005.

DEMOS/POSTERS

- Fedor S., Chau P., Bruno N., Picard R., Camprodon J. ,"Can we predict Depression from the asymmetry of Electrodermal activity? ," In the proceedings of the Connected Health Symposium, October 2016, Boston, MA.
- Fedor S., Chau P., Bruno N. Picard R., Camprodon J., "Asymmetry of Electrodermal Activity on the Right and Left Palm as Indicator of Depression for People Treated

with Transcranial Magnetic Stimulation," In the proceedings of the Annual Meeting of the Society of Biological Psychiatry (SOBP'16), 2016, Atlanta, Georgia.
- Sano, A., Fedor, S., and Picard, R. "Separation of Ambulatory Skin Conductance in Day and Sleep Activities based on Activity Magnitude and Sleep-Wake Scoring" In Proc. International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Milan, Italy, August 2015.
- Fedor, S., Picard, R. W., "Ambulatory EDA: Comparison of bilateral forearm and calf locations," In the Poster Session of 54th Annual Meeting of the Society for Psychophysiological Research (SPR), Atlanta, USA, September 10-14, 2014.
- Sitanayah, Lanny, Cormac J. Sreenan, and Szymon Fedor. "A cooja-based tool for maintaining sensor network coverage requirements in a building."*Proceedings of the 11th ACM Conference on Embedded Networked Sensor Systems*. ACM, 2013.
- Villaverde, B. C., Oury, J., Pesch, D., De Paz Alberola, R., & Fedor, S. "Commissioning of low power embedded devices with IPv6/CoAP." *Proceedings of the 10th ACM Conference on Embedded Network Sensor Systems*. ACM, 2012.
- Fletcher, R. R., Tam, S., Omojola, O., Redemske, R., Fedor, S., & Moshoka, J. M. "Mobile application and wearable sensors for use in cognitive behavioral therapy for drug addiction and PTSD." *Pervasive Computing Technologies for Healthcare (PervasiveHealth), 2011 5th International Conference on*. IEEE, 2011.

PATENTS
- Verification of compatibility among telecommunication network features, WO2011088898A1
- Service Performance in Communications Network, WO2012055449 A1
- Quality of service monitoring device and method of monitoring quality of service, WO2012052053A1
- Apparatus and method for monitoring performance in a communications network, WO2013091715A1
- 3 pending applications in the area of Internet of Things

SKILLS
- Languages: Trilingual: Polish, English, French
- Programming: Java, Python, C/C++, Android, NescC, TinyOS, Matlab, R

TRAINING
- Certificate in Applied Biostatistics, Harvard, September 2015 – June 2016
- Successful Grant Writing Strategies, Harvard, March-May 2016
- Effectively Communicating Research, Harvard, March 2016
- Data Visualization, VisualizaingData.com, February 2016
- Leadership Strategies for the Researcher, Harvard, November 2015
- Medical Device Development, Harvard, October 2015
- ESM Data Analysis Course, Maastricht University, September 2015
- Biomedical Signal and Image Processing, MIT, February-June 2015
- Kaufman Teaching Certificate Program, MIT, February-May 2015
- Understanding Biomarker Science: From Molecules to Images, Harvard, March -2015
- Heart Rate Variability, SPR conference workshop, Spetember 2014
- Python for Scientists and Engineers (Python Academy, January 2014)
- Advanced Android Programming (Learning Tree International, June 2011)
- Pattern Recognition and Analysis (Massachusetts Institute of Technology, Oct 2010 - Jan 2011)

- Java Best Practices (Learning Tree International, April 2010)
- Developing Java Applications with Spring framework (Learning Tree International, Sept 2009)
- Knowledge Modelling and Semantic Web (Trinity College Dublin, May 2009)
- Service Oriented Architecture with Java and .NET (Learning Tree International, Sept 2008)
- LTE and SAE (Ericsson Academy, August 2008)
- WCDMA System Overview (Ericsson Academy, July 2008)
- E-Commerce and Entrepreneurship (DCU Business School, Jan – Apr 2007)
- Technology Commercialization (Ryan Academy for Entrepreneurship, Dec 2005)
- Summer School on Wireless Sensor Networks and Smart Objects (University ETH Zurich, Aug – Sept 2005)

TEACHING EXPERIENCE
- Cellular network services, MSc course, University of Cork, 2011
- Cellular network services, MSc course, University of Cork, 2010
- Network Programming, Teaching Assistant, DCU, 2005
- Communications Theory, Teaching Assistant, DCU, 2006

PRESENTATIONS/INVITED TALKS
- *Improving mood and depression*, University of Cambridge, November 2016
- *Automated mood prediction and diagnosis*, MIT Media Lab members event, Oct 2016
- *Ambulatory physiological measurement*, Massachusetts General Hospital, Nov 2015
- *Smart, smarter, smartest – The increasing interdependence between medical devices and consumer electronics*, Accu-Chek Network meeting, Malta, April 2015
- *Wearables and Well-being* MIT Media Lab members event, October 2014
- *Tools, Services and Engineering methodologies for Robust, Adaptive, Self-organising and Cooperating Monitoring and Control Systems*, Conference Tutorial, IECON 2013
- *Next generation Smart Home*, Scuola Superiore Sant'Anna, Pisa, October 2013

MEMBER OF REVIEW COMMITTEE
- Conferences: CIICT'06, CASE'08, ICC'08, ICM Mobile Summit'08, EWSN'09, WCNC'09, APNOMS'09, GLOBECOM'09, IWCMC'09, MMNS'09, MANWEEK'09, FIA'09,
- Journals: IPSI Transactions journal, Springer Cluster Computing
- PhD defense: Daniele Alessandrelli, Scuola Superiore Sant'Anna, Pisa, Italy
- Funding review: CONICYT - Chilean government research agency

SCHOLARSHIPS AND AWARDS
- MGH-MIT Strategic Partnership Grand Challenge 1: Diagnostics, Round 2 (success rate 10%, $275k), MGH-MIT, 2015
- Marie Curie International Outgoing Fellowship (success rate 15%, 250kEuro), EU, 2012
- Industrial Technologies Awards for Successful Commercialisation of Research, Enterprise Ireland, 2006
- Commercialization of University Research Student Project Award, DCU Business School and Invent, 2006

PRESS
- 'Smartwatch' sensors to help diagnose depression, Horizon Magazine

REFERENCES

- Prof. Rosalind Picard, Director of Affective Computing group, MIT Media Lab, Cabridge, USA
- Prof. Cormac Sreenan, Head of Department of Computer Science, University College Cork
- Dr. Julie Greenberg, Director of Education, Harvard-MIT Program in Health Sciences & Technology and Institute for Medical Engineering & Science, MIT
- Dr Srdjan Krco, Principal Researcher, Ericsson