

# ISAAC AMUNDSON

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## OBJECTIVE

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I have a diverse background that spans biomedical science, mechanical engineering and computer science, and have worked extensively with enterprise, desktop application, and embedded systems technology. I am interested in fusing these disciplines in order to develop products that push the limits of science and engineering, and improve our standard of living.

## EDUCATION

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Doctor of Philosophy, Computer Science  
Vanderbilt University, Nashville, Tennessee, August 2010  
Dissertation Title: Spatio-temporal Awareness in Mobile Wireless Sensor Networks

Master of Science, Computer Science  
Vanderbilt University, Nashville, Tennessee, May 2006

Master of Science, Mechanical Engineering  
Vanderbilt University, Nashville, Tennessee, May 2004  
Thesis Title: A Decentralized Approach to Sound Source Localization with Sensornets

Bachelor of Science, Biomedical Science  
Antioch College, Yellow Springs, Ohio, April 1997

# EMPLOYMENT

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- 2016-Present Specialist Engineer, Industrial Sector Engineering Center of Excellence, Software, Electronics and Controls (SwEC), Eaton, Eden Prairie, MN.
- Leading sector-wide MBD tools and methods team to develop an MBD process for Industrial Sector application development.
  - Working with Industrial Sector systems engineering teams to implement a more disciplined engineering process.
  - Involved in multiple safety-critical projects to mitigate unexplained failures and out-of-plan safety concerns.
  - Proficient in industrial sector safety certification guidelines including DO-178C and IEC 61508 (TÜV certification expected November 2017).
- 2013-2015 Specialist Engineer, Dependable Systems, Corporate Research and Technology, Eaton, Eden Prairie, MN.
- Worked primarily in the Aerospace business to build capability and maturity in model-based development and formal methods.
  - Collaborated with academia to develop systems engineering modeling tools.
- 2011-2013 Senior Systems Engineer, CRDM Quality, Medtronic, Minneapolis, MN.
- Embedded with FW Product Development to work on a next generation device architecture, and evaluated several modern design-for-reliability methodologies. These included formal requirements analysis, model-based development, and automated code generation
    - These are fault prevention and removal techniques that, in addition to improving product dependability, reduce product development time and cost primarily through reduction in test effort.
  - Explored methods such as symbolic code verification and automatic test case generation, which are newer methodologies aimed at running the appropriate verification tests for FW.
    - These techniques provide better coverage, and are capable of testing over ranges of inputs, as opposed to the limited "directed" testing we do today.
- 2010-2011 Senior Software Reliability Engineer, CRDM Quality, Medtronic, Minneapolis, MN.
- Performed quality engineering activities for software and firmware product development to achieve regulatory certification objectives.
  - Proficient in IEC 62304
- 2005-2010 Research Assistant, Institute for Software Integrated Systems, Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, TN.
- Researched formal design-for-reliability methodologies for embedded systems including heterogeneous sensor network composition, time

- synchronization, multi-modal sensor fusion for target tracking, and localization and navigation in mobile wireless sensor networks.
- 2002-2005 Research Assistant, Vibro-Acoustics Laboratory, Department of Mechanical Engineering, Vanderbilt University, Nashville, TN.
- Distributed real-time embedded systems research involving sound source localization using sensor networks.
- 2002-2005 Programmer / Analyst, Department of Medicine, Division of Genetic Medicine, Vanderbilt University Medical Center, Nashville, TN.
- Programmed web and stand-alone statistical tools to analyze genetic data on both Windows and Linux multiprocessor platforms using C++ and Visual Basic on the .NET framework. These software tools enabled data analysis at a level that was previously unattainable.
- 2000-2002 Automation Engineer, Department of Medicine, Division of Genetic Medicine, Vanderbilt University Medical Center, Nashville, TN.
- Programmed drivers and user interfaces for laboratory robot automation. Integrated various bench-top robots to assist in reaction preparation and analysis. Outcome was an orders-of-magnitude improvement in throughput as well as a significant reduction in cost.
- 1999-2000 Computer Operator / Web Programmer, Cargill Investor Services, Chicago, IL.
- Maintained company network infrastructure as well as developed and maintained internal websites to assist with network operations and departmental upkeep.
- 1997-1998 Pre-IRTA Research Fellow, National Human Genome Research Institute (NHGRI), National Institutes of Health (NIH), Bethesda, MD.
- Performed high-throughput genomics to identify hereditary prostate cancer loci.
- 1995-1997 Intern, Synthetic Blood International, Yellow Springs, OH.
- Assisted in research of implantable glucose sensors as well as studied the effects of glucose and insulin administration in anoxic environments.

## SERVICE

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- 2012 Panelist, “Building a Compliant Verification & Validation Program”, Midwest Medical Devices Summit, Bloomington, MN
- 2011 Selection Committee Chair, SW/FW Conference, Medtronic, Mounds View, MN
- 2011 Technical Programming Committee, 4<sup>th</sup> International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT’11)

- 2010 Technical Programming Committee, 3<sup>rd</sup> International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT'10)
- 2009 Web Chair, 2<sup>nd</sup> International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT '09), Orlando, FL
- 2005-2008 Vanderbilt Undergraduate Research Journal Editorial Review Board
- 2003-2005 SIPHER graduate advisor, Vanderbilt University, Nashville, TN

## SELECTED PUBLICATIONS

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(A full list of publications can be found at <http://www.isaacamundson.com/publications>)

- Isaac Amundson, Lyle Shipton, Anshuo Liu, Michael Nowak. "Toward Efficient Model-Based Development for Aerospace Applications". In *AIAA Aviation and Aeronautics Forum and Exposition (Aviation 2015)*. Dallas, TX, June, 2015.
- Isaac Amundson, Manish Kushwaha, and Xenofon Koutsoukos. "A Method for Estimating Angular Separation in Mobile Wireless Sensor Networks". In *Journal of Intelligent and Robotic Systems*, doi:10.1007/s10846-012-9788-0, Springer, October, 2012.
- Isaac Amundson, Janos Sallai, Xenofon Koutsoukos, and Akos Ledeczi. "Mobile Sensor Waypoint Navigation via RF-Based Angle of Arrival Localization". In *International Journal of Distributed Sensor Networks*, Vol. 2012, Article 842107, Hindawi Publishing Corporation, 2012.
- Isaac Amundson, Janos Sallai, Xenofon Koutsoukos, Akos Ledeczi, and Miklos Maroti. "RF Angle of Arrival-based Node Localization". In *International Journal of Sensor Networks*, Vol. 10, No. 3, 2011.
- Isaac Amundson, Janos Sallai, Xenofon Koutsoukos, and Akos Ledeczi. "Mobile Sensor Navigation using Rapid RF-based Angle of Arrival Localization". In *the 17<sup>th</sup> IEEE Real-time and Embedded Technology and Applications Symposium (RTAS)*. Chicago, IL, 2011.
- Isaac Amundson, "Spatio-temporal Awareness in Mobile Wireless Sensor Networks", Ph.D. Dissertation, Vanderbilt University, 2010.
- Isaac Amundson, Janos Sallai, Xenofon Koutsoukos, and Akos Ledeczi. "Radio Interferometric Angle of Arrival Estimation". In *Proceedings of the 7<sup>th</sup> European Conference on Wireless Sensor Networks (EWSN)*, Coimbra, Portugal, 2010. Accepted for publication.
- Isaac Amundson and Xenofon Koutsoukos. "A Survey on Localization in Mobile Wireless Sensor Networks". In *2<sup>nd</sup> International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT)*, Orlando, FL, 2009.
- Isaac Amundson, Manish Kushwaha, and Xenofon Koutsoukos. "On the Feasibility of Determining Angular Separation in Mobile Wireless Sensor Networks". In *2<sup>nd</sup> International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT)*, Orlando, FL, 2009.
- Isaac Amundson, Xenofon Koutsoukos, and Janos Sallai. "Mobile Sensor Localization and Navigation using RF Doppler shifts". In *1<sup>st</sup> ACM International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments (MELT)*, San Francisco, CA, 2008.
- Isaac Amundson, Branislav Kusy, Peter Volgyesi, Xenofon Koutsoukos, and Akos Ledeczi. "Time Synchronization in Heterogeneous Sensor Networks". In *International Conference on Distributed Computing in Sensor Systems (DCOSS)*, Santorini, Greece, 2008.

- Isaac Amundson, Manish Kushwaha, Branislav Kusy, Peter Volgyesi, Gyula Simon, Xenofon Koutsoukos, and Akos Ledecz. "Time Synchronization for Multi-Modal Target Tracking in Heterogeneous Sensor Networks". In *Workshop on Networked Distributed Systems for Sensing and Control*, Kalamata, Greece, 2007.
- Isaac Amundson, Manish Kushwaha, Xenofon Koutsoukos, Sandeep Neema, and Janos Sztipanovits. "Efficient Integration of Web Services in Ambient-Aware Sensor Network Applications". In *Proceedings of the 3<sup>rd</sup> IEEE/CreateNet International Workshop on Broadband Advanced Sensor Networks (BaseNets)*, San Jose, CA, 2006.
- Isaac Amundson, Manish Kushwaha, Xenofon Koutsoukos, Sandeep Neema, and Janos Sztipanovits. "OASiS: A Service-Oriented Middleware for Pervasive Ambient-Aware Sensor Networks". Technical Report ISIS-06-706, Institute for Software Integrated Systems, Vanderbilt University, 2006.
- Isaac Amundson, Kevin Bradley, Brian Yaspan, and Jeffrey R. Smith. "EM2: Enhanced Computational Algorithm for Haplotype-Based Association Analysis in Case-Control Studies". *American Society of Human Genetics*, Salt Lake City, UT, 2005.
- Isaac Amundson, Peter L. Schmidt, and Kenneth D. Frampton. "A Decentralized Approach to Sound Source Localization with Sensor Networks". In *Proceedings of the 2004 International Mechanical Engineering Congress and Exposition (IMECE)*, Anaheim, CA, 2004.
- Isaac Amundson and Leland C. Clark. "High Insulin Dosage Leads to an Extension of Life During N<sub>2</sub> Ventilation Due to a Stored Energy Build-up in Mice". In *7<sup>th</sup> Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics*, Argonne National Laboratory, Argonne, IL, 1996.

## REFERENCES

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References available upon request.