Sara James

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SUMMARY: Accomplished engineer with over 10 years of experience in the areas of radar signal processing, data-derived adaptive filtering, detection techniques, and data visualization. Have led algorithm development teams and interfaced with sponsors, contractors, and high-level government officials.

EDUCATION:

Northeastern University, Boston, MA 09/2012 - 05/2014
Master of Science in Electrical Engineering, received May 2014
Cumulative GPA: 3.80
Concentration: Electromagnetics, Optics, and Plasmonics

Stevens Institute of Technology, Hoboken, New Jersey 08/2005 - 05/2009
Bachelor of Engineering in Electrical Engineering, received May 2009
Cumulative GPA: 3.97

Major Subjects:
Electromagnetics, Quantum Mechanics, Solid State Devices, Antenna Theory, Magnetics, Radar Signal Processing, Digital Signal Processing, Wireless Communications, Probability and Stochastic Processes

SKILLS:

Programming and Markup Languages: MATLAB, Python, C++, Lisp, HTML/CSS, LaTeX
Version Control: Git, Subversion (SVN), Concurrent Versions System (CVS), Perforce
CAD: SolidWorks, OnShape, SolidEdge, AutoCAD
Electromagnetic Modeling: Feko, WIPL-D Pro, Savant, XGTD, XFDTD
Software: Microsoft Office (Word, PowerPoint, Excel, Visio, Project, Publisher, OneNote), Simulink
Hardware: Oscilloscopes, multimeters, waveform generators, network analyzers, data timing generators

WORK EXPERIENCE:

MathWorks, Natick, MA
Senior Software Developer: 07/2018 - Present

- Extended radar and signal processing capabilities within the Phased Array System Toolbox, Sensor Fusion and Tracking Toolbox, and Signal Processing Toolbox
- Created the vision and minimum viable feature set for a new radar analysis app and led its development
- Constructed 3-D CAD models for ray-tracing feature and acted as consultant on electromagnetic modeling
- Enhanced performance of tracker analysis feature, decreasing run time from hours to less than 1 second
- Developed technical specifications for new features and presented designs to team and customers
- Implemented object-oriented designs in MATLAB that support code generation and Simulink workflows
- Validated features with the creation of comprehensive unit tests, achieving 100% code coverage

MIT Lincoln Laboratory, Lexington, MA
Associate Staff: 07/2009 - 06/2018

Airborne Radar Signal Processing

- Led team in developing advanced algorithms for next generation airborne early warning radars
- Guided program strategic vision, as well as developed schedules with milestones and deliverables
- Developed airborne adaptive signal processing chains in MATLAB for the assessment of terabytes of experimental and simulated flight data and briefed sponsors at quarterly program reviews
- Identified signal processing solutions resulting in 6 dB of improvement on average
- Parallelized signal processing code, decreasing run time from days to hours
- Analyzed an eigen-projection method to mitigate strong interference
- Utilized an adaptive blanking technique to inhibit false alarm detection in spatial sidelobes
- Investigated spatial-time adaptive training methods such as power selected training and de-emphasis
- Researched and implemented methods for the recovery of missing/corrupted data
- Developed code to facilitate processing of many files automatically using regular expressions

Wind Turbine Interference Mitigation Study

- Investigated strategies for wind turbine mitigation and developed MATLAB simulation for assessment
- Performed RF blockage electromagnetic modeling in Savant and investigated performance improvement
- Recommended an adaptive spatial cancellation technique to mitigate interference

Radar Survivability Study

- Led radar survivability study, determined project schedule and scope, and briefed sponsors
- Researched radar threat landscape and analyzed theoretical scenarios in a Monte Carlo simulation

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Through-Wall Radar Signal Processing

- Developed a constant false alarm rate detector to identify subjects walking and breathing
- Implemented a Kalman filter and greedy association algorithm to track subjects walking
- Assisted with the development of testing procedures to assess the performance of RF hardware

Electronic Protection (EP) Studies

- Created MATLAB simulation and presented results on radar tracker techniques to mitigate false targets
- Performed studies on active electronic protection and detection-level mitigation techniques

Digital Radio Frequency Memory (DRFM)

- Developed signal processing and technique visualization tools to verify performance of DRFM hardware
- Created templates and error checking code to ensure parameters were within hardware specifications

Northeastern University, Boston, MA
Research Assistant: 08/2012 - 05/2014

- Researched rapid evaluation of periodic Green's functions in 3-D electromagnetic scattering applications
- Investigated the usage of the discrete complex image method (DCIM) to accelerate the computation of the Green's functions for planarly layered structures
- Studied methods for extracting poles of EM systems considering computation time and noise sensitivity
- Researched the application of transformation optics to the design of optical processing components

CERDEC, Space and Terrestrial Communications Directorate, Fort Monmouth, NJ
SCEP Student: 05/2008 - 08/2008

- Designed and modeled antenna systems using SolidWorks and XFDTD
- Simulated antenna propagation and path loss in XGTD
- Performed anechoic chamber measurements including those to determine warfighter radiation exposure

Stevens Institute of Technology, Hoboken, NJ
Student Researcher: 05/2007 - 07/2007

- Worked on the module development and the formation of a graphical display for a spectrum analyzer
- Collected and analyzed spectrum occupancy measurements in the 2.4 – 2.485 GHz range

Durand Glass Manufacturing Company, Millville, NJ
Draftswoman: 05/2006 - 08/2006

- Drafted models from blueprints and augmented libraries of pipe fittings in SolidEdge and AutoCAD
- Updated factory piping layouts in AutoCAD and proposed a design for a new piping installation

TECHNICAL WRITING:

- Honglei Chen, Rick Gentile, Chaofeng Wang, and Sara James, “Algorithms to Antenna: Classifying Radar Micro-Doppler Signatures,” *Microwaves & RF*, Jan. 15, 2020.
- Honglei Chen, Rick Gentile, Prashant Arora, and Sara James, “Algorithms to Antenna: Modeling Multistatic Radar Systems,” *Microwaves & RF*, Oct. 16, 2019.
- Ethem Sozer, Sara James, Matt Sprague, and Honglei Chen, “Identify Modulation for Communications and Radar Using Deep Learning,” *Electronic Design*, Jul. 25, 2019.
- Sara James, “Wind Energy Interference Mitigation,” Tech Note, Posted May 2016.

TEACHING:

- MIT IAP 2017 Technology Innovation Accelerator, Organizer (2017)
- MIT OpenCourseWare Girls Who Build: Camera Workshop, Instructor (2016)
- MIT Lincoln Laboratory Resume Workshops for Students, Instructor (2016)

OUTREACH:

- Intern Innovative Idea Challenge (2016 - 2018)
- Lincoln Community Enhancement (2013 - 2018)
- Career Mentoring, Mentor (2013 - 2018)
- Recruiting (2010 - 2018)
- Science on Saturday, "Mission Control" (2015)
- Open House Demo Lead (2011 - 2012, 2015 - 2016)
- Diversity and Inclusion Events Organizer (2010 - 2013)
- SWE Wow! That's Engineering! (2011)
- GUIDE Program for New Hires (2010 - 2012)
- New Employee Network (2010 - 2012)

AWARDS: MIT Lincoln Laboratory Award for Service (2018), Nominated for LLINFINITY Award for Cultural Impact (2018), Director’s Office Recognition: Intern Innovative Idea Challenge Founding Committee (2017), Division 3 Recognition for Outstanding Contributions (2016), Director’s Office Recognition: New Employee Network Founding Committee (2012)

INTERESTS: Signal Processing, Data Analysis, Radar, Phased Arrays, Antennas, Electromagnetics

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