Dr. Tom Northardt **www.tnorthardt.com** **Telephone: (508) 463-6114**
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Motivated, disciplined, and thoughtful leader with a passion for cultivating innovative environments which develop inspired engineers and technology

Impactful Technological Solutions

- *Cybersecurity Risk Assessment*; Principal Scientist to develop a Bayesian software package for assessing cybersecurity risk of large information systems.
- *Raster Data Active Sonar Classifier*; Principal Scientist to develop a track-before-detect-based data active sonar target classifier aimed at classifying slowly-moving sonar contacts
- *Reconstruction Software Suite*; Principal Scientist to develop a software package to perform post-event platform position reconstruction for maritime naval exercises using linear and non-linear Kalman smoothing
- *Feature Unified Scoring Engine*; Principal Scientist and Lead Engineer to develop a software package to provide a highly novel solution to sonar contact tracking, multi-sensor fusion, acoustic propagation path estimation, and management large numbers of contacts
- *Minefield Training System*; Lead Engineer to develop a hardware and software solution for high-accuracy submerged platform navigation

Leadership Initiatives and Philosophy

- *Professional Development Series*; founded, organized, and conducted quarterly seminars open to voluntary company attendance. Topics varied from identifying potential career path options based on self-skills and passions to finance and retirement investing
- *Floor Time Diversity Presentation;* founded, organized, and coordinated periodic opportunities for technical professionals to present technical material to a diverse group of executives to improve the communication of technical material to non-technical audiences
- *Create an Innovative Culture That Builds People; The People That Build Technology;* this is a vision statement that embodies my philosophy of emphasizing the building of professionals first. When professionals are exposed, empowered, and elevated, they'll produce the requisite technology to improve our world. I have several leadership tenets:
    1. Never have team sizes in the double-digits; large teams must be broken into smaller teams
    2. Be a career planner and coach - help your team to envision their future, plan their goals, and hold them accountable – analogous to a financial planner
    3. Hold monthly or quarterly one-on-one meetings with your direct reports
    4. Establish rituals that increase team bonding - e.g. the "Good Hustle" ball
    5. Never, ever, stop learning – "a leader who is done learning, is done."

Awards Received

2018 AFCEA 40 Under 40	*An annual award recognition to 40 engineering professionals who have demonstrated a significant STEM contribution*
2018 Rhode Island	*A 2 year fellowship sponsored by Rhode Island for STEM professionals*

Wavemaker
Fellowship
2022 BAE Pioneer
Award

Professional Experience

Director, Research and Innovation, MIKEL Inc. (12 direct reports) 1/2020 - present
Program Manager and Principal Scientist, MIKEL Inc. (12 direct reports) 01/2017 – 12/2019
Technical Project Lead, MIKEL Inc. (5 direct reports) 06/13 – 01/2017
Electrical Engineer IV, MIKEL Inc. (0 direct reports) 06/04 – 06/13

- Began MIKEL's first Professional Development Seminar Series that provided quarterly seminars focused on building MIKEL's professionals. Topics ranged from identifying career trajectories, to retirement planning, to navigating difficult professional situations.
- Consistently invested in my team and other professionals. I would focus on understanding my team's goals as individuals (e.g. PhD students) and shaping professional goals to obtain a balance between their personal goals and MIKEL's business goals. I would hold monthly one-on-one meetings with several mentees to discuss professional development goals, career trajectories, and personal guidance.
- Began MIKEL's first Product Innovation Working Group, a.k.a Shark Tank. The group meets monthly and quarterly to discuss new product applications and identify new market opportunities. Identified market opportunities are investigated and ultimately pursued for business capture.
- Procured multiple funding sources in the amounts of **$200K** to **$2M** from various Depart of the Navy (DoN) sources such as PEO IWS-5A, PMS 401, PMS 425, PMS 485, Naval Undersea Warfare Center (NUWC) Code 85, and NUWC Code 15.
- Provided all customer interface, technical direction, administrative team organization, subcontractor interface, and financial tracking for all projects lead during this period
- Lead the development of cybersecurity risk assessment software for large information systems. The software would allow an information director or program manager to quickly assess their information systems' vulnerabilities against the SANS 20 Critical Security Controls and perform prediction. Contributed the Bayesian algorithm for assessment and prediction.
- Lead the development of feature unified scoring engine that provided a highly novel method for tracking and localizing sonar contacts. The software package would automatically address acoustic multipath and provide tactically relevant area-of-uncertainty estimates. Contributed advanced track-before-detect particle filtering algorithms and C/C++ GUI coding.
- Lead the development of reconstruction software suite that provided a single consolidated suite of tools to accomplish the task of maritime post-exercise reconstruction. The software package included data conditioning tools as well as advanced algorithms for estimating participant position, sensor location, and estimate of acoustic arrival paths. Contributed advanced linear and non-linear Kalman smoothing algorithms and ray tracing algorithms in MATLAB.
- Developed the first generation of a multi-generation minefield training system that provides highly accurate navigation technology for submerged platforms. Contributed multi-sensor signal processing algorithm development in C and GUI development in MATLAB.
- Developed an improved torpedo acquisition algorithm in MATLAB that offered more accurate area of uncertainty estimates. The algorithm was based upon geometric dilution of precision (GDOP) maneuver recommendations for the launching platform.

- Developed MATLAB GUI displays, software architecture support, and configuration management for a tactical readiness evaluation and debrief system. The software system was used to analyze various stages of submarine and submarine weapon mission effectiveness.

Residential Computer Consultant and Network Administration, University of Massachusetts, (0 direct reports) 09/00 – 05/04

- Configured university student residents for the university network.
- Provided software and hardware support for university residents.
- Installed and managed network components of the residential university network.

Education

University of Massachusetts Dartmouth ▪ Dartmouth, MA ▪ 2009 - 2013

- **Doctor of Philosophy – Electrical Engineering** (GPA 3.75) **–** Dissertation Title : *Applications and Extensions of Deterministic Expected Likelihood*

University of Massachusetts Dartmouth ▪ Dartmouth, MA ▪ 2006 – 2009

- **Master of Science – Electrical Engineering** (GPA: 3.667)

University of Massachusetts Dartmouth ▪ Dartmouth, MA ▪ 2000 – 2005

- **Bachelor of Science – Electrical Engineering** (GPA: 3.642)

For a listing of current research please visit www.tnorthardt.com

Technical Skills

- **Algorithm Development:** Sonar contact state estimation, acoustic ray propagation, contact state uncertainty regions, sonar data fusion, RF-based positioning, RF ultra-wide band mammography
- **Hardware Development:** PCB, Analog-to-digital conversion
- **Operating Systems:** Windows Server, Windows 10, Linux, (Fedora, Redhat, Ubuntu, CENTOS)
- **Software Development:** C, C++, Java, Visual Studio, Netbeans, CVS/SVN

Other Interests

- Exercise and nutrition
- American muscle cars
- Youth addiction ministry and outreach

Publications

[1] I. Bilik, T. Northardt, Y. Abramovich, "Expected likelihood for compressive sensing-based DOA estimation", *IET conference on radar systems*, Glasgow, UK, 2012.
[2] T. Northardt, I. Bilik, Y. Abramovich, *"*Spatial Compressive Sensing for Direction-of-Arrival Estimation with Bias Mitigation via Expected Likelihood*"*, *IEEE Transactions on Signal Processing*, vol. 61, March 2013.
[3] T.Northardt, I. Bilik, Y. Abramovich, "Bearings-Only Constant Velocity Target Maneuver Detection via Expected Likelihood*," IEEE Transactions on Aerospace and Electronics Systems*, vol. 50, October, 2014.
[4] T. Northardt, "An approach for automated passive sonar contact localization", *IEEE Underwater Signal Processing Workgroup*, Rhode Island, 2015.
[5] T. Northardt, D. Kasilingam, "Spectral extrapolation for super-resolution tumor localization in the breast," *Biomedical Engineering Letters*, 7(1), 25-30, 2017.
[6] T. Northardt, "Use of Basis Pursuit to detect weak sources among known strong interferers," *IEEE UASP Workshop*, Greenwhich, RI, October 2017.

[7] T. Northardt, S. Nardone "Track-Before-Detect Bearings-Only Localization Performance in Complex Passive Sonar Scenarios: A Case Study," *IEEE Journal of Oceanic Engineering*, April, 2018.
[8] T. Northardt, "A Case Study of the Higher Order Ambiguity Function to Array Element Signal Estimation For Non-Linear Sensor Array Fault Resiliency," *IET Radar, Sonar, and Navigation*, 2019.
[9] T. Northardt, "Track-Before-Detect applications for unmanned systems," *Submarine Technology Symposium*, Laurel, MD, May 16, 2019.
[10] T. Northardt, "The Higher Order Ambiguity Function Used For Non-Linear Sensor Array Fault In The Presence of Multiple Sources," *IEEE Phased Array Symposium*, Waltham, MA, USA, October, 2019.
[11] T. Northardt, "A Cramer-Rao Lower Bound for Passive Sonar Track-Before-Detect Algorithms," *IEEE Trans. On Information Theory*, Vol. 66, Issue 10, October, 2020.
[12] T. Northardt, "Observability Criterion Guidance for Passive Towed Array Sonar Tracking," *IEEE Trans. On Aerospace and Electronic Systems,* Vol. 58, No. 4, August, 2022.

Reviewed Journals

IET
IEEE Transactions on Aerospace and Electronic System
IEEE Transactions on Signal Processing
Information Fusion Conference (Fusion 2015, 2016)
JASA

Professional Memberships

IEEE
NDIA
SENEDIA
Industrial Advisory Board to the University of Massachusetts Dartmouth
Industrial Advisory Board to Blue Hills Regional Vocational Technical High School