WILLIAM J. TOMLINSON, PH.D.

Director – Software & Application Innovation Lab, 2022 - Present

Active US Top Secret Clearance, SCI SI/TK

(734) 560-9681 **C**
willjt@bu.edu **E**
(617) 358-6689 **O**

PROFESSIONAL SUMMARY

William is the Director of the Software & Application Innovation Lab (SAIL) at Boston University (BU). As Director, he is responsible for overseeing the operations of SAIL, while working closely with researchers at BU, to integrate SAIL software engineering appropriately throughout the spectrum of research projects and programs at the university. Prior to joining BU, William, as a Principal Engineer, led the Embedded & Comm. Systems Group at Draper (Cambridge, MA). Here he demonstrated proficiency in servant technical leadership, business development, strategic planning, program management and developing hardware and software systems for wireless communications.

COMPENTENCIES

Technical Direction

Proposal Writing

Strategic Planning

Staffing and Resource Capacity Management

Risk Assessment and Analysis

Organizational Culture Assessment

Mentoring

Diversity and Inclusion Initiatives

TECHNICAL SKILLS

Wireless Communications
Wireless Networking
Signal Processing
Software Defined Radio
Intentional EM Interference
RF System Integration
RF Front-End HW Design
RF Testing Automation
Python
MATLAB
GNU Radio

EDUCATION

Ph.D., Computer Engineering
Northeastern University
Draper Lab Fellow

M.S., Electrical Engineering
Michigan State University

B.S., Electrical Engineering
North Carolina A&T State University

BOSTON UNIVERSITY TECHNICAL EXPERIENCE

Director, Software & Application Innovation Lab (SAIL)

Boston University, Hariri Institute for Computing and Computational Science & Engineering | Jan 2022 – Present

- Oversees the operations of SAIL, while working closely with the Hariri Institute for Computing at BU, to integrate SAIL software engineering appropriately throughout the spectrum of research projects and programs at the university.
- Responsible for shaping and implementing long-term plans for SAIL with regards to prioritizing existing opportunities, managing growth, and developing new opportunities for collaboration and partnership
- Collaborates with faculty affiliates, in various disciplines, with the conception and pursuit of software engineering components of research projects for proposals to extramural funding agencies.

DRAPER TECHNICAL EXPERIENCE

Technical Lead, Program Budget: $18M, Team Size: 10

Novel Wireless Communications Program | January 2021 – December 2021

- Leading and working alongside a team of engineers conducting initial research, phenomenology studies, proof-of-concept experimental testbeds and prototype demonstrations of novel wireless communication schemes that enable mission critical customer operations

Technical Director, Program Budget: $900k, Team Size: 10

Intentional Electromagnetic Interference Program | March 2020 – Present

- Leading a team of engineers for feasibility study and experimental proof of concepts that enable mission critical customer operations
- Driver of multiple technical solution trade spaces and road maps based on customer requirements and art-of-the-possible
- Leading the evaluation of signal processing techniques to study secondary emission characteristics of MEMS and GPS front-end receivers

Technical Director, Program Budget: $3.6M, Team Size: 12

Space-Based Signals of Opportunity for GPS-Denied Environments | October 2018 – Present

- Led successful HW technology maturation (TRL 5 to TRL 7) in preparation for final demonstration (Nov. 2020), within budget and ahead of schedule
- Demonstrated ability to build upon current work to expand business development opportunities through customer discussions and white papers/proposals
- Researched space-based signals of opportunity using pre-defined criteria and constraints
- Developed experimental testbeds, with software defined radios and supporting RF front-end hardware, to determine feasibility of signal source integration into Talon SiLENCE system
- Developed SW analysis tools to characterize, diagnose and troubleshoot the behavior of signal sources pre and post-flight tests
- Created signal source study plan to identify potential signal sources for navigation outside of CONUS
- Integrated RF hardware within C-130 aircraft for simultaneous operation of Talon SiLENCE system and military communications
- Re-designed mobile airborne reference systems to increase hardware robustness, improve signal-to-noise ratio and minimize troubleshooting efforts in the field
- Performed high level planning of Phase 3 (PACOM hardware deployment) objectives through interactions with the customer and other contracted agencies
- Effectively negotiated program scope and managed the remote instruction of personnel, schedule, deadlines, and customer priorities to achieve an on-time ground reference system installation in PACOM

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Technical Lead, Program Budget: $2.3M, Team Size: 8
Passive Radar for Detection of Hypersonics using Signals of Opportunity Program | Oct. 2019 – July 2020

- Designed and implemented RF front end HW to facilitate data collection with software defined radio
- Developed custom data recording scripts for terrestrial signal source collection
- Developed MATLAB scripts to replay and post-process recorded data
- Created multiple platforms (MATLAB and GNU Radio) for recording and processing signal data, in real time, for field deployable testing
- Documented software processes to train multiple staff members on field test and data post-processing procedures

Technical Lead, Program Budget: $350k, Team Size: 4
Intentional Electromagnetic Interference Testing | September 2019 – November 2019

- Integrated software defined radio platform into stellar simulator to create a feedback loop for camera disruption
- Developed modular waveform generation SW for deployment on software defined radio via MATLAB
- Successfully demonstrated RF disruption of Stellar simulator, via software defined radio, with CW signals and OOK modulated signals

Technical Lead, Program Budget: $400k, Team Size: 4
Intentional Electromagnetic Interference Testing on UAV platforms | November 2018 – September 2019

- Designed and implemented testbed for high/low power density RF disruption experiments
- Assessed feasibility of testing hardware and procedures in preparation for empirical data collection
- Demonstrated RF disruption of IMU, magnetometer, gyroscope and servos of fixed-wing UAV
- Characterized power density, waveform type and center frequency for all observable RF disruptions
- Developed automation setup for real-time feedback of subsystem disruption via Python interface
- Developed post-processing algorithms for detecting anomalies in UAV system state information via MATLAB
- Created SW framework (in Python) for enabling indoor navigation during flight, without the use of GPS, using the motion capture lab to stream position and orientation data to the UAV platform

DRAPER ORGANIZATIONAL MANAGEMENT EXPERIENCE

Culture and Leadership Development Process Action Team, Team Size: 12
Internal Strategic Initiative to drive positive organizational culture change | July 2020 – Present

- Lead for the Baseline and Aspired Culture Assessment sub-committee
- Led the analysis and data processing of legacy and on-going surveys to generate Baseline Culture Findings
- Key contributor on work streams responsible for driving a shift towards aspired Draper culture with recommendations for Draper-wide strategic interventions/initiatives
- Led and co-developed interactive training sessions on Organizational Culture
- Key contributor on the presentation of Baseline Culture Findings, Aspired Draper Culture and Intervention recommendations to the new President and CEO, Bill LaPlante and the Executive Leadership Team

Student/Jr. Staff Mentoring and Supervision

Strategic Initiatives to champion a more inclusive & diverse work environment | Aug. 2018 – Present

- Mentor Jr. Staff and students on multiple programs to provide technical and professional development opportunities
- Provide technical training and replacement for Jr. Staff to take on lager technical leadership responsibilities

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Diversity Equity and Inclusion Enhancement
Internal Strategic Initiatives to champion a more inclusive & diverse work environment | Aug. 2013 – Present

- Lead the design and facilitation of the Draper NSBE Technical Challenge
- Key contributor in the organization of hiring/social events to recruit top professional level and student talent
- Demonstrated ability to strategize on ways for Draper to engage Underrepresented Minority (URM) population at large

PROPOSAL WRITING EXPERIENCE

MEMS and Navigation System Proposal, Award Amount: $1.3M
- Solicitor: United States Government | 2021

Counter UAS Proposal, Award Amount: $2.26M
- Solicitor: DTRA-TT | 2020

Distributed Alternative Position Navigation and Timing Proposal, Award Amount: $4M
- Solicitor: C5 | 2020

Multi-Alternative Position Navigation and Timing Proposal, Award Amount: $5M
- Solicitor: DOTC | 2019

Internal Research and Development Phase 1 Proposal, Award Amount: $2M
- Solicitor: Draper Laboratory | 2019

Signals of Opportunity Proposal, Award Amount: $600k
- Solicitor: DOTC | 2019

Internal Research and Development Phase 2 Proposal, Award Amount: $4.23M
- Solicitor: Draper Laboratory | 2019

Internal Research and Development Phase 2 Proposal, Award Amount: $2.28M
- Solicitor: Draper Laboratory | 2018

EAGER: USBRCCR: Health Sense, Award Amount: $300k
- Solicitor: National Science Foundation | 2017

ADDITIONAL PROFESSIONAL EXPERIENCE

GEM-Draper Lab Fellow
Ph.D. Candidate, Computer Engineering Northeastern University, Boston, MA | August 2013 – August 2018

- Evaluated the feasibility of using weak electrical current for communication among networked medically implantable devices
- Conducted the design and development of low power, physical layer, intra-body communication systems using weak electrical current for data transmission
- Developed a wearable implementation demonstrating intra-body communication for applications in mobile/personal device authentication

Research Engineer Intern
Samsung Research America, Think Tank Team, Mountain View, CA | May 2017 – August 2017

- Member of the Think Tank Team, within Samsung Research America, where disruptive concepts are transformed into products with large scale impact
- Designed and developed a prototype Transmitter and Receiver for application in Intra-Body Communication by means of an embedded system with supporting analog front end hardware
- Designed and developed a printed circuit board to support a wearable implementation of the Intra-Body Communication Transmitter and Receiver architecture
- Researched potential design modifications to an existing Samsung product to enable Intra-Body Communication

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Wireless Communications Research Intern

Intel Corporation, Intel Labs, Santa Clara, CA | May 2016 – September 2016

- Member of the Emerging Connectivity Solutions Team, under Wireless Communications Research
- Contributed to the development and design of a Low Power Wake-Up Receiver (LP-WUR) by researching solutions and developing simulation code to study and evaluate areas of possible performance improvement
- Researched the design and development of next generation of Wi-Fi and other connectivity solutions

PUBLICATIONS

- ***W. J. Tomlinson***, S. Banou , S. Blechinger-Slocum, C. Yu, and K. R. Chowdhury, *Body- Guided Galvanic Coupling Communication for Secure Biometric Data*, IEEE Trans. on Wireless Communication, vol. 18 , no. 8 , Aug. 2019.
- ***W. J. Tomlinson,*** S. Banou, C. Yu, M. Stojanovic and K. R. Chowdhury, *Comprehensive Survey of Galvanic Coupling and Alternative Intra-body Communication Technologies*, IEEE Communications Surveys and Tutorials, vol. 21, no. 2, second quarter 2019.
- ***W. J. Tomlinson***, S. Banou, C. Yu, M. Nogueira and K. R. Chowdhury, S*ecure On-skin Biometric Signal Transmission using Galvanic Coupling*, in Proceedings of IEEE INFOCOM 2019, Paris, France, May. 2019.
- ***W.J. Tomlinson,*** K. R. Chowdhury, and C. Yu, *Galvanic Coupling Intra-Body Communication Link for Real-Time Channel Assessment*, In Proceedings of IEEE INFOCOM Posters and Demos, San Francisco, CA. April. 2016.
- ***W. J. Tomlinson,*** F. Arbaca, K. R. Chowdhury, M. Stojanovic and C. Yu, *Experimental Assessment of Human-Body-Like Tissue as a Communication Channel using Galvanic Coupling*, Proceedings of 12th International Conference on Wearable and Implantable Body Sensor Networks, Cambridge, MA. June. 2015.
- ***W. J. Tomlinson***, K. R. Chowdhury and C. Yu, *A Multi-Cast Communication Scheme Using Weak Electrical Current for Intra-Body Networks*, Proceedings of 9th International Conference on Body Area Networks, London UK, Sept. 2014.
- ***W. J. Tomlinson***, B. Dong, S. Lorenz, and S. Biswas, *Node Localization via Analyzing Multi-path Signals in Ultrasound Sensor Networks*, Proceedings of SPIE Defense, Security, and Sensing Symposium (Sensing, Localization, and Processing IX), Baltimore, MD, May 2014.
- S. Lorenz, B. Dong, ***W. J. Tomlinson***, and S. Biswas, *Pulse-based Sensor Networking using Mechanical Waves through Metal Substrates*, In Proceedings of SPIE Defense, Security, and Sensing Symposium, Baltimore, MD. April 2013.

AWARDS & RECOGNITION

Best Publication Award Nominee

- Vice President of Engineering, Draper, Cambridge, MA | 2019

Northeastern University Outstanding Graduate Student

- Northeastern University Graduate Award Ceremony, Boston, MA | 2017

Draper + CBS Future Innovator Award & Commercial Spotlight

- Draper Laboratory Fellow, Cambridge, MA | 2016

ASEE Prism Magazine Cover Story

- American Society for Engineering Education, Washington, DC | 2014

GEM Technical Presentation Competition Winner, 2nd Place

- GEM Annual Board Meeting and Conference, San Diego, CA | 2014

GEM – Draper Laboratory Fellow Recipient

- Northeastern University and Draper Laboratory, Boston, MA | 2013