Tamara Bonaci

CONTACT INFORMATION

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EDUCATION

University of Washington (2009 - 2015)

Doctor of Philosophy in Electrical Engineering

Dissertation: Security and Privacy of Biomedical Cyber-Physical Systems

University of Washington (2009 - 2012)

Master of Science in Electrical Engineering

Research areas: Network Security; Systems, Controls and Robotics

University of Zagreb, Croatia (2003 - 2008)

5-year Dipl.Ing. degree in Electrical Engineering

Research area: Systems, Controls and Robotics

PROFESSIONAL EXPERIENCE

Northeastern University, Seattle, WA, USA

Lecturer (May 2016–current)

University of Washington, Seattle, WA, USA

Lecturer (Jan 2016–current)

Graduate Research Assistant (April 2013–Sept 2016)

Predoctoral Lecturer (Jan 2013–April 2013)

Graduate Teaching Assistant (Sept 2011–Dec 2012)

Graduate Research Assistant (Sept 2009–Sept 2011)

Spica Sustavi, Zagreb, Croatia

Software Engineer (Jan – Sept 2009)

HONORS AND AWARDS

2015 – The University of Washington Department of Electrical Engineering Yang Research Award for Outstanding Doctoral Student

2015 – The University of Washington Center for Information Assurance and Cybersecurity "Rising Star in Cybersecurity" Award for contributions to Medical Device Security

2015 – Invited participant to the 2015 NSF Early-Career Investigators Workshop on Cyber-Physical Systems in Smart Cities

2015 – UW Society of Women Engineers Outstanding Female Award for the Electrical Engineering Department

2014 – International Neuroethics Society Annual Meeting, American Journal of Bioethics Neuroscience (AJOB) Top Submission

2014 – Invited participant to the Rising Stars in EECS 2014, an academic career workshop for women

2014 – IEEE International Symposium on Ethics in Engineering, Science and Technology Best Paper Award

2009 – The first recipient of the "Irene Peden Fellowship" from the University of Washington, Department of Electrical Engineering

2007 – "Josip Loncar" award, presented by the University of Zagreb to the top 1% of its student population

2006 – "Josip Loncar" award, presented by the University of Zagreb to the top 1% of its student population

2004 – The Government of the Republic of Croatia merit-based student scholarship. Received four years in a row.

TRAVEL AWARDS

2014 – NSF Engineering Research Center for Sensorimotor Neural Engineering Graduate Student/Post-doc Travel Award

2014 – NSF Engineering Research Center for Sensorimotor Neural Engineering Student Leadership Committee Travel Award

2013 – NSF Engineering Research Center for Sensorimotor Neural Engineering Student Leadership Committee Travel Award

2012 – USENIX Security Symposium Student Travel Grant

2011 – Conference on Decision and Game Theory for Security Travel Grant

2010 – IEEE Conference on Decision and Control Travel Grant

RESEARCH INTERESTS

- Security and privacy of biomedical systems
- Security, privacy and stability of cyber-physical systems
- Mathematical modeling of security and privacy threats
- Neural engineering (e.g., bi-directional brain-computer interfaces, deep brain stimulators, visual implants)
- Robotics (e.g., teleoperated robotics)
- Machine learning and data analysis algorithms

PATENTS

1. H. J. Chizeck, **T. Bonaci**, and T. Lendvay, "Enhanced Security and Safety in Telerobotic Systems", US Patent Number: 9,148,443, Septebmer 29, 2015.

PENDING PATENTS

1. H. J. Chizeck, and **T. Bonaci**, "Brain-Computer Interface Anonymizer", Application Number: US 14/174,818, February 2014.
2. H. J. Chizeck, and **T. Bonaci**, "Using Supplemental Encrypted Signals to Mitigate Man-in-the-Middle Attacks on Teleoperated Systems", Application Number: PCT/ US2013/ 067528, October 2013.
3. Provisional patent in the area of haptic interaction, March 2015.

JOURNAL PUBLICATIONS

1. **T. Bonaci**, J. Herron, C. Matlack, and H. J. Chizeck, "Securing the Exocortex: A Twenty-first Century Cybernetics Challenge", *IEEE Technology and Society Magazine*, vol. 34, no. 3, 2015.
2. **T. Bonaci**, M. R. Calo and H. J. Chizeck, "App Stores for the Brain: Privacy & Security in Brain-Computer Interfaces", *IEEE Technology and Society Magazine*, vol. 34, no. 2, 2015.
3. **T. Bonaci**, J. Herron, T. Libey, B. Mogen, and H. J. Chizeck, "Privacy Threats Against Brain-Computer Interfaces", *American Journal of Bioethics, Neuroscience*, vol. 6, no. 4, 2015.
4. **T. Bonaci**, P. Lee, L. Bushnell and R. Poovendran, "A Convex Optimization Approach for Clone Detection in Wireless Sensor Networks", *Journal of Pervasive and Mobile Computing*, May 2012 (**fast track article**).

JOURNAL PUBLICATIONS IN PREPARATION

1. **T. Bonaci**, J. Yan, J. Herron and H. J. Chizeck, "Experimental Analysis of Cyber Security Attacks on Teleoperated Surgical Robotics", in preparation to the *ACM Transactions on Cyber-Physical Systems*, January 2017.
2. **T. Bonaci**, J. Herron and H. J. Chizeck, "Brain Malware: An Experimental Analysis of Privacy Threats Against Brain-Computer Interfaces", in preparation, 2017.

CONFERENCE PUBLICATIONS

1. T. Brown, P. Moore, J. Herron, M. Thompson, **T. Bonaci**, S. Goering and H. J. Chizeck, "Personal Responsibility in the Age of User-Controlled Neuroprosthetics", to be presented at the *2016 IEEE International Symposium on Ethics in Engineering, Science and Technology*, May 2016, Vancouver, BC, Canada.
2. J. Yan, K. Huang, **T. Bonaci**, and H. J. Chizeck, "Haptic Passwords", in the Proceedings of the *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems*, September 2015, Hamburg, Germany.
3. **T. Bonaci**, J. Yan, J. Herron, T. Kohno and H. J. Chizeck, "Experimental Analysis of Denial-of-Service Attacks on Teleoperated Robotic Systems", in the Proceedings of the *6th ACM/IEEE International Conference on Cyber-Physical Systems*, April 2015, Seattle, WA.
4. P. Moore, T. Brown, J. Herron, M. Thompson, **T. Bonaci**, S. Goering and H. J. Chizeck, "Personal Responsibility in the Age of User-Controlled Neuroprosthetics", in the Proceedings of the *4th Annual Conference on Robotics, Law and Policy*, April 2015, Seattle, WA. Seattle, WA.
5. **T. Bonaci**, A. Alva, J. Herron, R. Calo and H. J. Chizeck, "I Did It My Way: On Law And Operator Signatures for Teleoperated Robots", in the Proceedings of the *4th Annual Conference on Robotics, Law and Policy*, April 2015, Seattle, WA.
6. **T. Bonaci**, J. Herron, C. Matlack, and H. J. Chizeck, "Securing the Exocortex: A Twenty-first Century Cybernetics Challenge", in the *Proceedings of the IEEE 2014 Conference on Norbert Wiener in the 21st Century*, June 2014, Boston, MA.
7. **T. Bonaci**, M. R. Calo and H. J. Chizeck, "App Stores for the Brain: Privacy & Security in Brain-Computer Interfaces", in the *Proceedings of the 2014 IEEE International Symposium on Ethics in Engineering, Science, and Technology*, May 2014, Chicago, IL (**best paper award**).
8. **T. Bonaci** and H. J. Chizeck, "On Potential Security Threats Against Rescue Robotic Systems", in the *Proceedings of the 10th IEEE International Symposium on Safety, Security, and Rescue Robotics*, November 2012, College Station, TX.
9. **T. Bonaci** and H. J. Chizeck, "Surgical Telerobotics Meets Information Security", in the *Proceedings of the Robotics, Science and Systems Workshop on Algorithmic Frontiers in Medical Robotics: Manipulation in Uncertain, Deformable, Heterogeneous Environments*, July 2012, Sydney, Australia.
10. **T. Bonaci** and L. Bushnell, "Node Capture Games: A Game Theoretic Approach to Modeling and Mitigating Node Capture Attacks", in the *Proceedings of the 2nd Conference on Decision and Game Theory for Security*, November 2011, College Park, MD.
11. **T. Bonaci**, P. Lee, L. Bushnell and R. Poovendran, "Distributed Clone Detection in Wireless Sensor Networks: An Optimization Approach", in the *Proceedings of the 2nd IEEE International Workshop on Data Security and Privacy in Wireless Networks*, June 2011, Lucca, Italy.
12. **T. Bonaci**, L. Bushnell and R. Poovendran, "Node Capture Attack on Wireless Sensor Networks: A System Theoretic Approach", in the *Proceedings of the 49th IEEE Conference on Decision and Control*, December 2010, Atlanta, GA.

ABSTRACTS

1. M. Ehlert, K. Pratt, **T. Bonaci**, and H. J. Chizeck, "Neural Security for Brain-Computer Interfaces ", *Final Presentations of the CSNE Research Experience for Veterans*, August 2016, Seattle, WA.
2. **T. Bonaci**, J. Herron, T. Libey, B. Mogen, and H. J. Chizeck, "How Susceptible is the Brain to the Side-Channel Private Information Extraction? An Experimental Analysis Using Non-invasive Brain-Computer Interfaces", *44th Society for Neuroscience Annual Meeting*, November 2014, Washington, DC.
3. K. Pratt, **T. Bonaci**, and H. J. Chizeck, "Neural Security for Brain-Computer Interfaces ", *NeuroFutures Conference 2016*, June 2016, Seattle, WA.
4. **T. Bonaci**, J. Herron, T. Libey, B. Mogen, and H. J. Chizeck, "How Susceptible is the Brain to the Side-Channel Private Information Extraction? An Experimental Analysis Using Non-invasive Brain-Computer Interfaces", *44th Society for Neuroscience Annual Meeting*, November 2014, Washington, DC.
5. **T. Bonaci**, J. Herron, T. Libey, B. Mogen, and H. J. Chizeck, "How Susceptible is the Brain to the Side-Channel Private Information Extraction? An Experimental Analysis Using Non-invasive Brain-Computer Interfaces", *2014 International Neuroethics Society Annual Meeting*, November 2014, Washington, DC (**AJOB Top Submission**).
6. H. J. Chizeck, T. Kohno, and **T. Bonaci**, "CPS Breakthrough: Secure Telerobotics", *5th NSF Cyber-Physical Systems Principal Investigators' Meeting*, November 2014, Arlington, VA.
7. T. Yusuf, **T. Bonaci**, T. Kohno, and H. J. Chizeck, "Dr. Hacker, I Presume? An Experimentally-based Discussion about Security of Teleoperated Surgical Systems", *2014 USENIX Summit on Health Information Technologies*, August 2014, San Diego, CA.
8. **T. Bonaci**, and H. J. Chizeck, "Experimental Analysis of Brain Malware in Brain-Computer Interfaces", *NeuroFutures Conference 2014*, June 2014, Seattle, WA.
9. H. J. Chizeck, T. Kohno, and **T. Bonaci**, "CPS Breakthrough: Secure Telerobotics", *4th NSF Cyber-Physical Systems Principal Investigators' Meeting*, November 2013, Arlington, VA.
10. **T. Bonaci** and H. J. Chizeck, "Telerobotic Surgery Meets Information Security", *21st USENIX Security Symposium*, August 2012, Bellevue, WA.

INVITED RESEARCH PRESENTATIONS

1. **T. Bonaci**, "Brains Can Be Hacked. Why Should You Care?", Usenix Enigma 2017, January 2017, Oakland, CA.
2. **T. Bonaci**, "Security and Privacy for Robots and Brains", Pacific Northwest National Laboratory's Analysis in Motion Seminar Series, February 2016, Seattle, WA.
3. **T. Bonaci**, "Cyber Security for Teleoperated Robots in Smart Cities", 2015 NSF Early-Career Investigators' Workshop on Cyber-Physical Systems in Smart Cities, April 2015, Seattle, WA.
4. **T. Bonaci**, "Privacy by Design in Brain-Computer Interfaces", *Techno-Activism 3rd Mondays: Seattle*, March 2015, Seattle, WA.
5. **T. Bonaci**, "Privacy and Security by Design in Brain-Computer Interfaces", *Rising Stars in EECS, An Academic Career Workshop for Women*, November 2014, Berkeley, CA.
6. **T. Bonaci**, "Privacy and Security by Design in Brain-Computer Interfaces", *PhD Symposium in conjunction with the IEEE 2014 Conference on Norbert Wiener in the 21st Century*, June 2014, Boston, MA.
7. **T. Bonaci**, "Secure Telerobotics", *Scholars' Studio: Robot Research at the Commons, University of Washington*, February 2014, Seattle, WA.

OTHER PUBLICATIONS

1. **T. Bonaci**, J. Herron, T. Yusuf, J. Yan, T. Kohno, and H. J. Chizeck, "To Make a Robot Secure: An Experimental Analysis of Cyber Security Threats Against Teleoperated Surgical Robotics", arXiv: 1504.04339, April 2015.
2. **T. Bonaci**, "Privacy & Security in Brain-Computer Interfaces", *University of Washington Electrical Engineering Kaleidoscope*, 2015.
3. **T. Bonaci**, "Secure Telerobotics", *University of Washington Electrical Engineering Kaleidoscope*, 2014.
4. **T. Bonaci** and H. J. Chizeck, "Privacy by Design in Brain-Computer Interfaces", *University of Washington Department of Electrical Engineering Technical Report*, UWEETR-2013-0001, February 2013.
5. **T. Bonaci**, "Modeling and Mitigating Node Capture Attacks in WSNs", *University of Washington Electrical Engineering Kaleidoscope*, 2012.
6. **T. Bonaci**, L. Bushnell and R. Poovendran, "Probabilistic Analysis of Covering and Compromise in Node Capture Attacks", *Network Security Lab Technical Report*, March 2010.

GRANTS, CONTRACTS AND GIFT SUPPORT

- **NSF Engineering Research Center for Sensorimotor Neural Engineering Seed Grant: Wearable Sensors, BCI Learning and Security**

  PI: Tamara Bonaci

  Duration: December 16, 2013 – December 15, 2015

  Amount: $12,000

NATIONAL AND INTERNATIONAL PRESS

- L. Vass, Naked Security by Sophos How Hacking Brainwaves Could Reveal Our Deeply Guarded Secrets, August 2016.
- V. Turk, VICE Motherboard How Hackers Could Get Inside Your Head With Brain Malware, August 2016.
- V. Turk, VICE Motherboard We Tried to Operate A Surgical Robot While It Was Being Hacked, July 2016.
- I. Mester, Engineering.com, Engineers Hijack Teleoperated Robots, May 2015.
- S. Gallagher, Ars Technica, Researchers Craft Network Attacks to Hack Surgical Robots (Sort Of), May 2015.
- S. Brownstone, The Stranger Blog, University of Washington Researchers Hack A Remotely Controlled Surgical Robot, Showing Us How Profoundly Vulnerable We Are, May 2015.
- S. Hodsden, MED Device Online, Scientists Hack Teleoperated Surgical Robot to Expose Security Flaws, May 2015.
- The Engineer, US Team Calls for Hack-Proof Robots, May 2015.
- L. Vaas, Sophos Naked Security, Remotely Operated Surgery Robot is Easy to E-Hijack, researchers find, April 2015.
- S. Misra, iMedicalApps, Surgical Robot Hacked by Computer Science Experts, Not the Imminent Threat Being Implied in Media, April 2015.
- D. Storm, ComputerWorld, Researchers Hijack Teleoperated Surgical Robot: Remote Surgery Hacking Threats, April 2015.
- A. Ossola, Popular Science, Robots Used In Long-Distance Surgery Can Easily Be Hacked, April 2015.
- R. Chirgwin, The Register, Surgery-bot Can be Hacked to Hack You to Pieces, April 2015.

- J. O'Callaghan, Daily Mail, Hackers Can Take Over Medical Equipment: Security Experts Discover Telesurgery Robots Are at Risk from Cyber Attacks, April 2015.
- The Security Ledger, Surgical Robots The Latest To Fall To Whitehats, April 2015.
- K. Rommelfanger, Meet-a-Member:Tamara Bonaci, March 2015.
- T. Bishop, GeekWire Radio: Brain-computer interfaces and the future of personal privacy, July 2014.
- The Dr. Katherine Albrecht Radio Show, June 2014.
- Infinity Box Theatre Seattle, Thought Experiments on the Questions of Being Human: Prosthetics and Neural Engineering ("Truth and Lies", original play based on our research project, written by R. Tang and directed by S. Porkalob), June 2014.
- M. Kaste, Think Internet Data Mining Goes Too Far? Then You Won't Like This, NPR All Things Considered, May 2014.

UNIVERSITY RELATED PRESS

- J. Langston, UW Today, UW Researchers Hack a Teleoperated Surgical Robot to Reveal Security Flaws, May 2015.
- The UW Department of Electrical Engineering, The First to Hack a Teleoperated Surgical Robot, UW EE Researchers Prove Security Risks Exist, April 2015.
- The NSF Engineering Research Center for Sensorimotor Neural Engineering, Young Scholars Program, November 2014.
- M. Toles, Amping Up the Brain Security, August 2014.
- M. Guiden, Researcher Tackles Online Security of Brain-Computer Interfaces, The NSF Engineering Research Center for Sensorimotor Neural Engineering "Engage and Enable" Blog, July 2014.
- E. McReynolds, Spotlight on Tech Policy Lab Scholar Tamara Bonaci, Tech Policy Lab Blog, February 2014.

RESEARCH EXPERIENCE

- **BioRobotics Laboratory, University of Washington**
  Graduate Research Assistant (2012 – September 2015)
  - Principal student researcher on two projects: *Security and Privacy by Design in Brain-Computer Interfaces (BCIs)* and *Secure Telerobotics*.
  - Using non-invasive BCI, experimentally investigated the hypothesis that persons' electro-physiological signals can be used to extract their private information.
  - Proposed and designed a signal processing tool to enhance privacy and security of BCIs, referred to as the *BCI Anonymizer*.
  - Identified that next generation teleoperated robotic systems are vulnerable to several classes of cyber-security threats, and experimentally evaluated impact of these threats.
  - Proposed and developed several novel methods to prevent cyber security threats against teleoperated robots, based on the way teleoperators interact with robots.
  - Principal Investigator on the seed project titled *Wearable Sensors, BCI Learning and Security*. The purpose of this collaborative project was the development of fundamental software and hardware tools, algorithms and metrics to used for several CSNE-wide neural engineering projects.
  - Relevant experience: cyber-physical systems; security and privacy; bio-sensing; biometrics; robotics (surgical robotics and teleoperation); haptic interaction; BCI; signal processing; data analysis; tech policy; experimental design; computer games development; human subject experimentation; student mentoring; grant writing.

- **Tech Policy Lab, University of Washington**
  Student Member (2013 – 2015)
- **NSF Engineering Research Center for Sensorimotor Neural Engineering**
  Student Member (2013 – 2015)
- **Network Security Lab, University of Washington**
  Graduate Research Assistant (2009 – 2012)
  - Worked in the area of wireless sensor network security, with focus on the analysis and mitigation of the *node capture attack*.
  - Researched and developed impact models of the node capture attack, and showed that control- and game-theoretic methods can be applied to improve attack mitigation. I proposed an optimal mitigation controller for node capture attack.
  - Relevant experience: wireless sensor network security; network simulator development; mathematical modeling and optimization; game theory; grant writing.
- **Advanced Control Team, University of Zagreb, Croatia**
  Undergraduate Research Assistant (2007 – 2008)
  - Research project: *Disturbance compensation using model predictive control of piecewise affine systems*.
  - Researched and developed an optimal controller, and an estimation method to compensate an impact of disturbances on an electronic throttle operating under constraints. The controller was designed using model predictive control methods, and the estimator was based on the Unscented Kalman Filter.
  - Relevant experience: optimal control; system identification and estimation; Kalman filter methods.

TEACHING EXPERIENCE

- **Lecturer, Northeastern University** (May 2016 – current)
  - CS 5770 Software Vulnerabilities and Security (Spring 2017)
  - CS 5770 Software Vulnerabilities and Security (Summer 2016)
- **Lecturer, University of Washington** (January 2016 – current)
  - EE 595P Algorithmic Introduction to Data Privacy (Spring 2017)
  - EE 595P Introduction to Security and Privacy (Winter 2017)
  - EE 590P Analytical Methods for Electrical Engineers (Autumn 2016)
  - EE 418 Network Security and Cryptography (Autumn 2016)
  - EE 595P Security and Privacy of Biomedical Cyber-Physical Systems (Spring 2016)
  - EE 595P Advanced Topics in Communication Theory (Winter 2016)
- **Predoctoral Lecturer, University of Washington** (January – April 2013)
  - AA/EE/ME 548 Linear Multivariable Control (Winter 2013)
- **Research Seminar Lead, University of Washington**
  (September - December 2013)
  - Organized and held a graduate-level research seminar *Electrical Engineering Research Survey*.
- **Graduate Teaching Assistant, University of Washington**
  (September 2011 – December 2012)
  - Taught several senior undergraduate and graduate-level courses in Departments of Electrical Engineering and Computer Science and Engineering:

- EE 547 Linear Systems Theory (Autumn 2012)
- CSE 421 Introduction to Algorithms (Summer 2012)
- EE 585 System Identification and Adaptive Control (Spring 2012)
- CSE 374 Intermediate Programming Tools and Concepts (Winter 2012)
- EE 547P Linear Systems Theory (Autumn 2011)

- **Guest Lecturer, University of Washington** (May, October 2014)
  - Invited lecture "Privacy and Security by Design in Brain-Computer Interfaces" in course DXARTS 490, Special Topics in Digital Arts and Experimental Media (Autumn and Spring 2014 quarters).
- **Undergraduate Teaching Assistant, University of Zagreb** (2003 – 2008)
  - Courses: Signals and Systems, Digital Electronics, Elements of Automatic Process Control, Modeling and Simulating Processes, Mathematical Modeling using Wolfram's Mathematica, Electronic Measurements and Instrumentation, Digital Signal Processing.

MENTORING EXPERIENCE

- **Graduate students, University of Washington**
  (September 2016 – current)
  - Mentored an Electrical Engineering Masters student, working on projects related to security and privacy of emerging biomedical devices.
    * Aleaxander Matsuoka, (Winter 2017 - current)
    * Anne Marie Goldman, (Autumn 2016 - current)
- **Undergraduate students, University of Washington**
  (September 2013 – June 2015)
  - Mentored several undergraduate students in Electrical Engineering and Computer Science and Engineering departments. The students were involved in experimental analysis with human subjects, both in neural engineering and telerobotic security projects.
    * Ethan Mayer, (Winter - Spring 2015)
    * Xiyu Ouyang, (Fall 2013 - Summer 2014)
    * Tariq Yusuf, (Fall 2013 - Summer 2014)
    * Nguyen Le my Chau, (Winter - Spring 2014)
    * Fethya Mohamed Ibrahim, (Spring 2014)
    * Sunjay Cauligi, (Fall 2013)
- **High school students, University of Washington**
  (June – September 2014)
  - Mentored a high school student who participated in the summer research experience through the NSF Engineering Research Center for Sensorimotor Neural Engineering.
  - The student has learned the basics of Matlab and Arduino programming.

DEVELOPMENT EXPERIENCE

- **Spica Sustavi, Zagreb, Croatia**
  Software Engineer (January – September 2009)
  - Worked on the development of a distributed management solution for a logistics company. My assignments included database design and development of a variety of mobile applications used for shipment tracking and communication between drivers and the main control unit.
- **University of Zagreb, Croatia**
  Software Engineer (January – June 2006)
  - Worked on preliminary analysis and software development for smart cards with Java Card OpenPlatform (JCOP) operating system.

  Lead Software Engineer (April – October 2005)

– Lead developer on an e-learning project, where we designed a back-end server and a web application used for students evaluation in several undergraduate courses.

PROFESSIONAL SERVICES

2017 – Guest Editor, *Elsevier Robotics and Autonomous Systems*, special issue *Cyber-Security in Robotics and Autonomous Systems*, January 2018.

2017 – Reviewer, *2017 American Controls Control*

2017 – Program Committee Member, *1st International Workshop on Semantic Robotics*

2016 – Panel Member, *2016 NSF CPS panel*

2016 – Reviewer, *ACM Transactions on Cyber-Physical Systems*

2016 – Reviewer, *IEEE Transactions on Robotics*

2016 – Reviewer, *IEEE Transactions on Automatic Control* (since 2014)

2016 – Reviewer, *Energies*

2016 – Program Committee Member, *2016 IEEE International Symposium on Safety, Security and Rescue Robotics*

2016 – IEEE SSIT Representative, *IEEE Brain Initiative*

2016 – Program Committee Member, *IEEE SMC 2016 6th Workshop on Brain-Machine Interface Systems*

2016 – Reviewer, *55th IEEE Conference on Decision and Control*

2016 – Reviewer, *MDPI Sensors* (since 2014)

2015 – Reviewer, *2016 American Controls Conference*

2015 – Reviewer, *IEEE Potentials* (since 2012)

2015 – Reviewer, *Annals of Telecommunications*

2015 – Reviewer, *Computers in Human Behavior*

2015 – Program Committee Member, *13th IEEE International Symposium on Safety, Security, and Rescue Robotics*

2015 – Reviewer, *7th IEEE International Workshop on Information Forensics and Security*

2015 – Panelist, *University of Washington Women in Science and Engineering Annual Conference, panel "Going to Graduate School"*

2014 – Panelist, *NSF Panel on CPS Education and Diversity*

2014 – Program Committee Member, *12th IEEE International Symposium on Safety, Security, and Rescue Robotics*

2014 – Student Volunteer, *NeuroFutures Conference*

2013 – Program Committee Member, *11th IEEE International Symposium on Safety, Security, and Rescue Robotics*

2011 – Student Volunteer, *9th ACM Conference on Embedded Networked Sensor Systems*

2010 – Reviewer, *Elsevier Ad Hoc Networks Journal*

2006 – Technical Committee Member, *13th Central European Olympiad in Informatics*

COMMUNITY SERVICES

2017 – Member of the EE Graduate Admissions Committee, *UW Department of Electrical Engineering*

2016 – Member of the EE Undergraduate Admissions Committee, *UW Department of Electrical Engineering*

2014 – Student Leadership Council Officer, *NSF Center for Sensorimotor Neural Engineering*

2014 – Travel Awards Committee Member, *NSF Engineering Research Center for Sensorimotor Neural Engineering Student Leadership Committee*

2013 – Co-Chair, *UW Electrical Engineering Graduate Students Association*

2013 – Departmental Awards Committee Member, *UW Department of Electrical Engineering*

2013 – Volunteer, *UW Engineering Discovery Days*

PROFESSIONAL MEMBERSHIPS

- The Advanced Computing Systems Association (USENIX)
- Northwest NeuroNeighborhood (NWNN)
- The Center for Responsible Brainwave Technologies (CeReB)
- The NeuroEthics Women (NEW) Leaders