



# Daniel Smullen

## Curriculum Vitae

*"Don't have good ideas if you aren't willing to be responsible for them."  
—Alan Perlis*

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### Education

Est. 2021 **Doctor of Philosophy Candidate (Computer Science, Software Engineering)**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania.

Institute for Software Research, Committee: Norman Sadeh (Chair), Lorrie Faith Cranor, Alessandro Acquisti, Rebecca Weiss (External, Mozilla), Yaxing Yao (External, UMBC)



2018 **Master of Science (Software Engineering)**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania.

Institute for Software Research

2014 **Bachelor of Engineering (Software Engineering)**, *University of Ontario Institute of Technology*, Oshawa, Ontario, *Honours with Distinction*.

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### Academic Work Experience

2014 – Present **PhD Candidate**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Institute for Software Research.

2020 **Teaching Assistant**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Institute for Software Research.

17-781/45-887: Mobile and IoT Computing Services

2017 – 2019 **Research Advisor**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Institute for Software Research.

Mentor for 3 undergraduate research programmers and 1 masters student.

2016 **Teaching Assistant**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Institute for Software Research.

17-655/17-755: Architectures for Software Systems

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- 2013 – 2014 **Research Associate**, *University of Ontario Institute of Technology*, Oshawa, Ontario.  
Software Quality Research Lab, Advisor: Jeremy Bradbury
- Investigated privacy in meta-data unknowingly released through Internet traffic, in an ethics board approved user study.
  - Investigated the software testing coupling effect using mutation testing tools and automation.
  - Research funded by NSERC/CRSNG (Canada).
- 2013 **Undergraduate Researcher**, *University of Ontario Institute of Technology*, Oshawa, Ontario.  
Software Engineering Lab, Advisor: Ramiro Liscano
- Studied tinyOS-based wireless sensor networks, applying policy-based programming to create a new development environment (Policy IDE).
  - Developed remote development environments for embedded ubiquitous computing on tinyOS using IPv6.
  - Research funded by NSERC/CRSNG (Canada) Undergraduate Student Research Award.

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## Industrial Work Experience

- 2015 **334F Affiliate (Radar Science and Instrument Engineering)**, *NASA Jet Propulsion Laboratory*, Pasadena, California.  
Supervisor: Razi Ahmed
- Developed a high-performance distributed radar image processing system.
  - Developed an efficient interferometry filtering algorithm; processing time was reduced from weeks to minutes.
  - Developed a portable implementation for heterogeneous computing platforms at NASA Ames high performance compute cluster (Pleiades) and commodity desktop hardware.
  - Deployed interferometry software in production radar applications for UAVSAR program.
- 2012 **Engineer in Training**, *SNC-Lavalin Global Information Technologies*, Toronto, Ontario.
- Conducted a reliability study on mission-critical data center systems.
  - Established new guidelines for disaster recovery and emergency response planning.
  - Conducted an infrastructure improvement planning study.
  - Developed a streamlined workstation staging infrastructure; deployment times reduced from hours to minutes.
  - Developed replacement systems for legacy DOS systems infrastructure.
- 2011 **Support Technician**, *SNC-Lavalin Global Mining and Metallurgy*, Toronto, Ontario.
- Provided dedicated technical support for high-value clients and senior executive management.
  - Conducted seminars on computer and network security, repair, open source software, and computer forensics.
  - Developed automated data recovery systems.
  - Performed high-risk data forensics and recovery on destroyed hardware.
- 2009 **Laboratory Systems Administrator**, *DESSAU, LVM-Technisol*, Toronto, Ontario.
- Managed migration and replacement of legacy laboratory information management systems.
  - Conducted field work in geotechnical engineering, subsurface sampling, concrete and asphalt QA/QC testing.
  - Performed in-situ quality testing on major airport and highway resurfacing projects.
  - Managed migration and integration of networks and computer systems during LVM-JEGEL company merger.

- 2009 **Laboratory Systems Administrator**, *John Emery Geotechnical Engineering Limited (JEGEL)*, Toronto, Ontario.
- Acted as liaison for City of Toronto special projects.
  - Managed 2009 Trans-Canada Highway Rehabilitation geoinformatics.
  - Managed 2009 Toronto Capital Works Program utility location and geotechnical subsurface sampling safety program.
  - Developed ISO 9001 certified laboratory information management software.
  - Performed debugging and repair of legacy pavement analysis embedded systems software.
  - Performed engineering, design and construction of a file storage and database systems datacenter.

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## Funded Research Projects

- 2020-2021 **Engineering Usable Privacy and Security Affordances For Notice and Choice**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: Defense Advanced Research Projects Agency, US Air Force Research Laboratory (FA8750-15-2-0277), National Science Foundation Secure and Trustworthy Computing program (CNS-15-13957, CNS-1801316, CNS-1914486)
- 2019-2020 **Design and Evaluation of Security and Privacy Nudges**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: National Science Foundation Secure and Trustworthy Computing program (CNS-1330596, SES-1513957, CNS-1801316)
- 2018-2019 **Internet of Things Privacy Infrastructure (Patent Pending)**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: Defense Advanced Research Projects Agency, US Air Force Research Laboratory (FA8750-15-2-0277), National Science Foundation Secure and Trustworthy Computing program (CNS-15-13957, CNS-1801316, CNS-1914486)
- 2017-2019 **DARPA Brandeis: A Privacy Assistant for the Internet of Things**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: Defense Advanced Research Projects Agency, US Air Force Research Laboratory (FA8750-15-2-0277), National Science Foundation Secure and Trustworthy Computing program (CNS-15-13957, CNS-1801316, CNS-1914486)
- 2017-2019 **The Usable Privacy Policy Project**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: National Science Foundation Frontier Grant on Usable Privacy Policies (CNS-1330596, CNS-1330141, CNS-1330214)
- 2017 **Mobile App Privacy Compliance System (Patent Pending)**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Norman Sadeh.  
Funded by: National Science Foundation Frontier Grant on Usable Privacy Policies (CNS-1330596, CNS-1330141, CNS-1330214), National Science Foundation XSEDE: Extreme Science and Engineering Discovery Environment (ACI-1548562)
- 2016 **Eddy: A Privacy Requirements Specification Language**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, Advisor: Travis Breaux.  
Funded by: National Science Foundation (CNS-1330596), US Office of Naval Research (N002441410028), National Security Agency
- 2015 **Non-local Interferometric Synthetic Aperture Radar Parameter Estimator**, *NASA Jet Propulsion Laboratory*, Pasadena, California, Advisor: Razi Ahmed.  
Funded by: National Aeronautics and Space Administration JPL PhD Fellowship
- 2014 **Incident Recognition and Intelligence System (IRIS)**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Shahryar Rahnamayan.  
Funded by: University of Toronto Intelligent Transportation Systems Laboratory, University of Ontario Institute of Technology, NSERC/CRSNG (Canada)

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- 2014 **Automated Marking System (AMS)**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Kamran Sartipi.  
Funded by: University of Ontario Institute of Technology
- 2013 **Policy IDE**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Ramiro Liscano.  
Funded by: NSERC/CRSNG (Canada)
- 2013 **TOSServ**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Ramiro Liscano.  
Funded by: NSERC/CRSNG (Canada)
- 2013 **Finger2IPv6**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Ramiro Liscano.  
Funded by: NSERC/CRSNG (Canada)
- 2013 **Military Logistics Management System (MLMS)**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Eyhab Al-Masri.  
Funded by: University of Ontario Institute of Technology
- 2012 **sneakyFS Secure Journaling Encrypted File System**, *University of Ontario Institute of Technology*, Oshawa, Ontario, Advisor: Kamran Sartipi.  
Funded by: University of Ontario Institute of Technology
- 2012 **Datacenter Utilization Research Study**, *SNC-Lavalin Global Information Technologies*, Toronto, Ontario, Advisor: Marc Ross.  
Funded by: SNC-Lavalin

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## Refereed Publications

**D. Smullen**, Y. Feng, S. A. Zhang, and N. Sadeh, "The best of both worlds: Mitigating trade-offs between accuracy and user burden in capturing mobile app privacy preferences," *Proceedings on Privacy Enhancing Technologies*, vol. 2020, no. 1, pp. 195–215, 2020.

P. Story, **D. Smullen**, A. Acquisti, L. F. Cranor, N. Sadeh, and F. Schaub, "From intent to action: Nudging users towards secure mobile payments," in *Sixteenth Symposium on Usable Privacy and Security (SOUPS 2020)*, 2020, pp. 379–415.

S. Zimmeck, P. Story, **D. Smullen**, A. Ravichander, Z. Wang, J. Reidenberg, N. C. Russell, and N. Sadeh, "Maps: Scaling privacy compliance analysis to a million apps," *Proceedings on Privacy Enhancing Technologies*, vol. 2019, no. 3, pp. 66–86, 2019.

P. Story, S. Zimmeck, A. Ravichander, **D. Smullen**, Z. Wang, J. Reidenberg, N. C. Russell, and N. Sadeh, "Natural language processing for mobile app privacy compliance," in *AAAI Spring Symposium on Privacy-Enhancing Artificial Intelligence and Language Technologies*, 2019.

S. Wilson, F. Schaub, F. Liu, K. M. Sathyendra, **D. Smullen**, S. Zimmeck, R. Ramanath, P. Story, F. Liu, N. Sadeh, and N. A. Smith, "Analyzing privacy policies at scale: From crowdsourcing to automated annotations," *ACM Transactions On The Web*, vol. 13, no. 1, Dec. 2018.

A. Das, M. Degeling, **D. Smullen**, and N. Sadeh, "Personalized privacy assistants for the internet of things: providing users with notice and choice," *IEEE Pervasive Computing*, vol. 17, no. 3, pp. 35–46, 2018.

**D. Smullen** and T. Breaux, "Improving security in software acquisition with data retention specifications," 2017. [Online]. Available: <https://calhoun.nps.edu/handle/10945/58892>

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**D. Smullen** and T. Breaux, "Towards rapid re-certification using formal analysis," 2015. [Online]. Available: <https://calhoun.nps.edu/handle/10945/53561>

J. Bhatia, T. Breaux, L. Friedberg, H. Hibshi, and **D. Smullen**, "Privacy risk in cybersecurity data sharing," in *Proceedings of the 2016 ACM on Workshop on Information Sharing and Collaborative Security*, 2016, pp. 57–64.

**D. Smullen** and T. Breaux, "Modeling, analyzing, and consistency checking privacy requirements using eddy," in *Proceedings of the Symposium and Bootcamp on the Science of Security*, 2016, pp. 118–120.

T. Breaux, **D. Smullen**, and H. Hibshi, "Detecting repurposing and over-collection in multi-party privacy requirements specifications," in *2015 IEEE 23rd international requirements engineering conference (RE)*. IEEE, 2015, pp. 166–175.

**D. Smullen**, J. Gillett, J. Heron, and S. Rahnamayan, "Genetic algorithm with self-adaptive mutation controlled by chromosome similarity," in *2014 IEEE Congress on Evolutionary Computation (CEC)*. IEEE, 2014, pp. 504–511.

N. Qwasmi, **D. Smullen**, and R. Liscano, "Integrated development environment for debugging policy-based applications in wireless sensor networks," *Procedia Computer Science*, vol. 21, pp. 225–233, 2013.

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## Invited Talks

- 2020 **The Best of Both Worlds: Mitigating Trade-offs Between Accuracy and User Burden in Capturing Mobile App Privacy Preferences**, *20th Privacy Enhancing Technologies Symposium (PETS 2020)*, Online, Conference.
  - Presented conference talk for peer reviewed publication and participated in panel discussions.
- 2019 **Digital Data Flows Masterclass: Mobile Apps**, *Future of Privacy Forum*, Online, Conference.
  - Provided lectures and discussion session as featured expert.
- 2018 **Personalized Privacy Assistant Project**, *US Federal Trade Commission PrivacyCon*, Washington D.C., Conference.
  - Presented poster with oral presentation and participated in panel discussions.
- 2017 **Assisting Users in a World Full of Cameras: A Privacy-aware Infrastructure for Computer Vision Applications**, *US Federal Trade Commission PrivacyCon*, Washington D.C., Conference.
  - Presented poster with oral presentation and participated in panel discussions.
- 2017 **A Privacy Assistant for the Internet of Things**, *13th Symposium On Usable Privacy and Security (SOUPS 2017)*, San Jose, California, Conference.
  - Presented poster with oral presentation and participated in panel discussions.
- 2016 **Toward a Semantics for Data Retention in Eddy**, *National Institute of Standards and Technology (NIST)*, Gaithersburg, Maryland.
  - Delivered an invited research talk, hosted by NIST Applied Cybersecurity Division.
- 2015 **Privacy Engineering Tool Clinic**, *Computing Community Consortium Catalyst, Privacy by Design Workshop*, Pittsburgh, Pennsylvania.
  - Delivered an invited talk with tool demonstration and discussion panel session.

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- 2015 **Detecting Repurposing and Over-Collection in Multi-party Privacy Requirements Specifications**, *23rd IEEE International Requirements Engineering Conference*, Ottawa, Ontario, Conference.
  - Presented conference talk for peer reviewed publication and participated in panel discussions.
- 2015 **Towards Rapid Re-Certification Using Formal Analysis**, *United States Navy Postgraduate School 12th Annual Acquisition Research Symposium*, Monterey, California, Conference.
  - Presented conference talk for peer reviewed publication and participated in panel discussions.
- 2014 **Genetic Algorithm with Self-Adaptive Mutation Controlled by Chromosome Similarity**, *IEEE World Congress on Computational Intelligence (WCCI 2014), Evolutionary Computation Conference (CEC 2014)*, Beijing, China, Conference.
  - Presented conference talk for peer reviewed publication and participated in panel discussions.
- 2013 **How Much Do We Reveal Through Metadata? An Assessment of Online Privacy**, *IBM Consortium for Software Engineering Research (CSER 2013)*, Toronto, Ontario, Conference.
  - Presented poster with oral presentation and participated in panel discussions.
- 2013 **Policy IDE... and Lessons Learned Since**, *The 4th International Conference on Emerging Ubiquitous Systems and Pervasive Networks (EUSPN 2013)*, Niagara Falls, Ontario, Conference.
  - Presented conference talk for peer reviewed publication and participated in panel discussions.
- 2013 **Facilitating the Internet of Things with Policy Programming**, *UOIT Undergraduate Research Showcase*, Oshawa, Ontario, Conference.
  - Presented poster with oral presentation and participated in panel discussions.

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## Professional Service

- 2021 **External Program Committee Member**, *Conference on Human Factors in Computing Systems (CHI 2021)*, Online, Conference.
  - Refereed submissions and participated in discussions.
- 2020-2021 **Council Member**, *Cylab Justice Equity Diversity and Inclusion (JEDI) Council*, Carnegie Mellon University.
  - Helped establish a new committee to promote justice, equity, diversity, and inclusion in faculty candidates, talks, hiring and student affairs.
- 2020 **External Program Committee Member**, *Conference on Human Factors in Computing Systems (CHI 2020)*, Honolulu, Hawai'i, Conference.
  - Refereed submissions, and participated in discussions and shepherding in the Late Breaking Works track.
- 2019-2020 **Committee Member**, *Institute for Software Research Branding Committee*, Carnegie Mellon University.
  - Participated in coordinating and analyzing the results of a market research campaign for re-branding the department, establishing a new messaging/communications strategy, and developing a novel recruiting strategy for diverse faculty and doctoral students.
- 2018-2021 **Co-Founder**, *Institute for Software Research Forge Makerspace*, Carnegie Mellon University.
  - Performed layout, development, maintenance, and instruction for the makerspace, leading safety training and other projects related to developing CNC machining, 3d printing, and CAD capabilities for the department.
- 2018-2020 **Co-Founder**, *Institute for Software Research Lunch and Learn Seminar Series*, Carnegie Mellon University, Seminar.
  - Managed and taught weekly seminars concerning a variety of software engineering topics, aimed at improving software development best practices among researchers.

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- 2018 **Program Committee Member**, *European Conference on Information Systems (ECIS2018)*, Portsmouth, UK, Conference.
  - Refereed submissions, and participated in discussions and shepherding.
- 2016 **Program Committee Member**, *International Workshop on Privacy Engineering (IWPE 16)*, San Jose, California.
  - Refereed submissions, and participated in discussions and shepherding.
- 2015 **Web Chair**, *International Conference on Multicore Software Engineering, Performance, and Tools (MUSEPAT 2014)*, Hong Kong, China, Conference.
  - Organized conference website and coordinated program committee.
- 2015 **Review Committee Member**, *Institute for Software Research PhD Applicant Review Committee*, Carnegie Mellon University.
  - Reviewed applications for incoming doctoral students, and participated in the final acceptance decision making panel.

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## Awards







- 2017 **Distinguished Poster Award**, *13th Symposium On Usable Privacy and Security (SOUPS 2017)*, San Jose, California.
- 2017 **Hima and Jive Fellowship in Computer Science for International Students**, *Carnegie Mellon University*, Pittsburgh, Pennsylvania.
- 2015 **Ready-Set-Transfer Award**, *23rd IEEE International Requirements Engineering Conference*, Ottawa, Ontario, "*Eddy: A privacy requirements specification language*".
  - Awarded first place in competitive industrial panel talks.
- 2014 **Faculty of Engineering and Applied Science Undergraduate Capstone Design Challenge Winner**, *University of Ontario Institute of Technology*, Oshawa, Ontario, "*Incident Recognition and Intelligence System (IRIS)*".
  - Awarded first place in capstone research project competition, evaluated by a panel of academic and industrial experts.
- 2012–2014 **President's Honours List**, *University of Ontario Institute of Technology*, Oshawa, Ontario.
  - Awarded for exceptional academic achievement, with greater than 3.7 GPA.
- 2013 **National Science and Engineering Research Council (NSERC/CRSNG) Undergraduate Research Award**, *University of Ontario Institute of Technology*, Oshawa, Ontario.
  - Awarded federally funded research grant with competitive review process, funding 1 year of undergraduate research in engineering.
- 2011 **Dean's Honours List**, *University of Ontario Institute of Technology*, Oshawa, Ontario.
  - Awarded for exceptional academic achievement, with greater than 3.5 GPA.
- 2008 **Engineers Without Borders Design Challenge Winner**, *McMaster University*, Hamilton, Ontario.
  - Awarded first place in a software requirements specification competition for distribution of AIDS medication in rural Africa.
- 2007 **DaVinci Engineering Design Challenge Winner**, *University of Toronto*, Toronto, Ontario.
  - Awarded first place in an engineering design challenge for remote controlled electric motorized aquatic vehicles, in Electrical Engineering and Fluid Dynamics competition stream.

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## Languages

English	Native Proficiency
French	Verbal, Written Proficiency
German	Verbal, Written Proficiency

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## Professional Memberships

- Since 2020 **HackPGH Makerspace**, *Member*.
- Since 2018 **Institute for Software Research Forge Makerspace**, *Founding Member*.
- Since 2019 **Pitcairn Monroeville Sportsmen's Club**, *Full Member*.
- Since 2014 **Collaborative Institutional Training Initiative**, *Physical Science Responsible Conduct of Research, Social & Behavioral Research*, Carnegie Mellon University.
- Since 2014 **The Corporation of the Seven Wardens**, *Order of the Calling of the Engineer*, Camp 1, Toronto, Ontario.
- Since 2013 **Institute of Electrical and Electronics Engineers (IEEE)**, *Student Member*.
- IEEE Communications Society
  - IEEE Internet of Things
  - IEEE Sensors Council
  - IEEE Software Defined Networks
- Since 2011 **International Red Cross**, *Class C Emergency First Aid, CPR and Defibrillator Certification*.
- Since 2009 **Burlington Rifle and Revolver Club**, *Range Officer and Instructor*.