

# Travis D. Breaux, Ph.D.

Software and Societal Systems Department  
Carnegie Mellon University  
5000 Forbes Avenue  
Pittsburgh, PA 15217 USA

breaux@cs.cmu.edu  
<http://www.cs.cmu.edu/~breaux>

*Last Updated: 8/7/2024*

---

## Education

|   |         |
|---|---------|
| <b>NORTH CAROLINA STATE UNIVERSITY</b><br>Doctorate of Philosophy in Computer Science; Advisor: Annie I. Antón        | 05/2009 |
| <b>UNIVERSITY OF OREGON</b><br>Bachelor of Science in Computer and Information Science<br>Awarded Departmental Honors | 12/2003 |
| <b>UNIVERSITY OF HOUSTON</b><br>Bachelor of Arts in Anthropology  | 05/1999 |

---

## Research and Teaching Experience

**CARNEGIE MELLON UNIVERSITY**  
Software and Societal Systems Department  
Pittsburgh, Pennsylvania

- (08/2019–Present) Associate Professor with Indefinite Tenure.
- (04/2019–Present) Director of the Masters of Software Engineering Professional Programs: Providing leadership in administrative, financial and program planning for a suite of professional Masters degrees in software engineering.
- (08/2016–08/2019) Associate Professor.
- (08/2010–07/2016) Assistant Professor: Conducting research and teaching on requirements, software engineering, and legal compliance-related topics.

**NATIONAL SECURITY AGENCY**  
Research Directorate, Maryland

- (11/2017–10/2018) Senior Researcher. Conducts research in privacy, security and systems engineering, and explores technology transition opportunities.

**INSTITUTE FOR DEFENSE ANALYSES**  
Information Technology and Systems Division  
Alexandria, Virginia

- (06/2009–8/2010) Research Staff Member: Multiple projects funded under the Office of the Secretary of Defense, include Defense Research and Engineering (DDR&E)

**NORTH CAROLINA STATE UNIVERSITY**  
College of Engineering, Department of Computer Science

Raleigh, North Carolina

(09/2004–05/2009) Research Assistant to Dr. Annie I. Antón: Developed systematic, formal methods to acquire and model legal security and privacy requirements for trustworthy and dependable information systems. Project funded by the IBM PhD Fellowship awarded by the IBM Center for Advanced Studies, Research Triangle Park, NC

### PURDUE UNIVERSITY

Center for Education and Research in Information Assurance and Security  
West Lafayette, Indiana

(05/2006–8/2006) Research Assistant to Dr. Annie I. Antón, Dr. Eugene H. Spafford: Analyzed U.S. Federal regulations to acquire privacy and security access requirements to manage ambiguity, conflicts and complex exceptions. Project funded by NSF ITR CyberTrust *Policy-Driven Framework for Online Privacy Protection* (NSF 043-0166)

### IBM THOMAS J. WATSON RESEARCH CENTER

Department of Privacy Enabling Technology  
Hawthorne, New York

(05/2005–08/2005) Research Assistant to Dr. Claire-Marie Karat: Analyzed organizational security policies from several large organizations and security standards (ISO 27000 series, NIST SP 800 series, etc.) Evaluated existing policy languages (EPAL, P3P, XACML) for mapping between human- and machine-readable policies.

### OAK RIDGE NATIONAL LABORATORY

Applied Software Engineering Research Group  
Oak Ridge, Tennessee

(04/2004–08/2004) Research Assistant to Dr. Robert Patton: Researched terrorist attack scenario prediction techniques from sparse, open source intelligence; developed methods and interactive tools to reduce polysemy in place-name geo-location.

(06/2003–08/2003) Research Assistant to Dr. Thomas E. Potok: Applied ontology to hierarchical clustering on semi-structured data for information retrieval from document repositories.

### Awards and Recognition

---

- **Distinguished Paper.** Sarah Santos, Travis Breaux, Tom Norton, Sara Haghghi, Sepideh Ghanavati. “Requirements Satisfiability with In-Context Learning,” *32<sup>nd</sup> IEEE International Conference on Requirements Engineering (RE’24)*, 2024. **Challenge Award**, a special designation for the research paper most likely “to (re)shape the frontiers of RE.”
- **Best Reviewer Award.** *31<sup>st</sup> IEEE International Conference on Requirements Engineering (RE’23)*, 2023.
- **Best Reviewer Award.** *29<sup>th</sup> Working Conference on Requirements Engineering Foundations for Software Quality (REFSQ)*, 2023.
- **Distinguished Paper.** Travis D. Breaux, Thomas B. Norton. (2022) “Legal Accountability as Software Quality: A U.S. Data Processing Perspective.” *29<sup>th</sup> IEEE International Requirements Engineering Conference (RE’22)*, pp. 101-113.
- **Best Reviewer Award:** Voted “one of the best (among thousands of submitted reviews!)” *Journal of Software and Systems Modeling*, 2021.
- **Distinguished Paper Award:** Jaspreet Bhatia, Travis D. Breaux. (2018) “Semantic Incompleteness in Privacy Policy Goals,” *26<sup>th</sup> IEEE International Requirements Engineering Conference (RE’18)*, Banff, Canada, pp. 159-169.
- **Distinguished Reviewer Award:** *40<sup>th</sup> ACM/IEEE International Conference on Software Engineering (ICSE)*, 2018.
- **Honorable Mention for RE 2016 Most Influential Paper Award:** Travis D. Breaux, Matthew W. Vail, Annie I. Antón (2006). “Towards Compliance: Extracting Rights and Obligations to Align Requirements with

Regulations,” *IEEE 14<sup>th</sup> International Requirements Engineering Conference (RE’06)*, Minneapolis, MN, USA, pp. 49–58.

- **Best Paper Nomination:** Jaspreet Bhatia, Travis Breaux, Joel Reidenberg, Thomas Norton. (2016) “Towards a Theory of Vagueness and Privacy Risk Perception in Privacy Policies.” *24<sup>th</sup> IEEE International Requirements Engineering Conference*.
- **Honorable Mention in the 7<sup>th</sup> Annual Privacy Papers for Policy Makers Award:** Joel R. Reidenberg, Jaspreet Bhatia, Travis D. Breaux, Thomas B. and Norton (2016). “Ambiguity in Privacy Policies and the Impact of Regulation,” *Journal of Legal Studies*, 45(S2): pp. S163-S190.
  - **Impact on Legislation:** Paper also cited by the California Department of Justice as among “documents that the Department has relied upon during this rulemaking process” to create the California Consumer Privacy Act (CCPA)
- **Best Paper Nomination:** Travis D. Breaux, Ashwini Rao, (2013) “Formal Analysis of Privacy Requirements Specifications for Multi-Tier Applications” *21<sup>st</sup> IEEE International Requirements Engineering Conference*, Rio de Janeiro, pp. 14-23.
- **Best Paper Nomination:** David G. Gordon, Travis D. Breaux, (2012) “Reconciling Multi-Jurisdictional Legal Requirements: A Case Study in Requirements Water Marking,” *20<sup>th</sup> IEEE International Conference on Requirements Engineering*, Chicago, Illinois, Sep. 2012, pp. 91-100

## Professional Positions and Memberships

---

Vice Chair of the IFIP Working Group 2.9 on Requirements Engineering, February 2024-Present  
Member of the IFIP Working Group 2.9 on Requirements Engineering, since May 2015  
Chair of the Security and Privacy Committee of the USACM, 2012-2015  
Member of the Executive Council of the USACM, 2014-2015  
Member (at large) of the U.S. Public Policy Council of the ACM, 2011, re-appointed through 2013  
Member of the CMU Masters of Software Engineering Executive Committee, since Dec. 2012  
Member of the International Association of Privacy Professionals, since September 2010  
Member of the U.S. Public Policy Committee of the ACM, since June 2006  
Member of the IBM Data Governance Council, February 2005-2006  
Member of the IEEE Computer Society, since January 2006, Senior Member since 2014  
Member of the ACM Special Interest Group on Software Engineering (SIGSOFT), since August 2006  
Member of the Privacy Place, a CERIAS Affiliate, since September 2004  
Member of Institute for Electrical and Electronics Engineers (IEEE), since January 2004  
Member of Association for Computing Machinery (ACM), since August 2003, Senior Member since 2014

## Steering, Organizing and Program Committees and Editorships

---

Program Committee Member, *31<sup>st</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, Barcelona, Spain, 2025.

Organizing Chair, *34<sup>th</sup> IEEE International Requirements Engineering Conference (RE’26)*, Savannah, Georgia, United States, 2026.

Organizing Chair, *National Science Foundation (NSF) Workshop on Designing Accountable Software Systems (DASS)*, November 18-19, Warrenton, VA, 2024.

Organizing Committee Member, Journal First Track Co-Chair, *32<sup>nd</sup> IEEE International Requirements Engineering Conference (RE’24)*, Reykjavik, Iceland, 2024.

Program Committee Member, *30<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, Winterthur, Switzerland, 2024.

Program Committee Member, Doctoral Symposium, *31<sup>st</sup> IEEE International Requirements Engineering Conference (RE’23)*, Hannover, Germany, 2023.

Program Committee Member, Research Track, *31<sup>st</sup> IEEE International Requirements Engineering Conference (RE'23)*, Hannover, Germany, 2023.

Program Committee Member, *29<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, Barcelona, Catalunya, Spain, 2023.

Steering Committee Member, *IEEE International Requirements Engineering Conference*, September 2019-August 2024.

Editorial Board Member, *Transactions on Software Engineering Methodology (TOSEM)*, September 2018-September 2023

Program Committee Member, *44<sup>th</sup> ACM/IEEE International Conference on Software Engineering*, Pittsburgh, USA, May 2022.

Program Committee Member, RE:Next! Track, *30<sup>th</sup> IEEE International Requirements Engineering Conference (RE'22)*, Melbourne, Victoria, Australia, 2022.

Program Committee Member, Doctoral Symposium, *28<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, United Kingdom, 2022.

Program Committee Member, *29<sup>th</sup> IEEE International Requirements Engineering Conference (RE'21)*, Notre Dame, South Bend, USA, 2021.

Program Committee Member, *27<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, Essen, Germany, 2021.

Doctoral Symposium Co-Chair, *27<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, Essen, Germany, 2021.

Program Co-Chair, *28<sup>th</sup> IEEE International Requirements Engineering Conference (RE'20)*, Zurich, Switzerland, September 2020.

Program Committee Member, *42<sup>nd</sup> ACM/IEEE International Conference on Software Engineering*, Seoul, South Korea, May 2020.

Program Committee Member, *27<sup>th</sup> IEEE International Requirements Engineering Conference (RE'19)*, Jeju Island, South Korea, September 2019.

Program Committee Member, Doctoral Symposium, *41<sup>st</sup> ACM/IEEE International Software Engineering Conference*, Montreal, Canada, September 2019.

Co-Organizing Chair, *SCORE Workshop on Computational Cybersecurity in Compromised Environments (C3E)*, Georgia Tech University, September 16-18, 2018.

Program Committee Member, *26<sup>th</sup> IEEE International Requirements Engineering Conference (RE'18)*, Banff, Canada, September 2018.

Program Committee Member, *40<sup>th</sup> ACM/IEEE International Conference on Software Engineering*, 2018.

Program Co-Chair, *RE:Next! Track at the 24<sup>th</sup> IEEE International Requirements Engineering Conference (RE'16)*, Beijing, China, September 2016.

Program Committee Member, Doctoral Symposium, *24<sup>th</sup> IEEE International Requirements Engineering Conference (RE'16)*, Beijing, China, September 2016.

Program Committee Member, *23<sup>rd</sup> IEEE International Requirements Engineering Conference (RE'15)*, Ottawa, Canada, September 2015.

Organizing Co-Chair, *8<sup>th</sup> International Workshop on Requirements Engineering and Law (RELAW'15)*, co-located with RE'15, Ottawa, Canada, September 2015.

Organizing Co-Chair, *Privacy by Design Workshop Series* hosted at Berkeley, Georgia Tech, CMU and NYU, sponsored by the Computing Community Consortium, August 2014-November 2015.

Workshops Chair, *22<sup>nd</sup> IEEE International Requirements Engineering Conference (RE'14)*, Karlskrona, Sweden, September 2014.

Organizing Co-Chair, *7<sup>th</sup> International Workshop on Requirements Engineering and Law (RELAW'14)*, co-located with RE'14, Karlskrona, Sweden, September 2014.

Program Committee, *36<sup>th</sup> IEEE International Conference on Software Engineering (ICSE)*, Hyderabad, India, June 2014.

Program Committee, *20<sup>th</sup> Working Conference on Requirements Engineering: Foundations for Software Quality*, Essen, Germany, April 2014.

Organizing Co-Chair, *6<sup>th</sup> International Workshop on Requirements Engineering and Law (RELAW'13)*, co-located with RE'13, Rio de Janeiro, Brasil, July 2013.

Program Board Member, *21<sup>st</sup> IEEE International Requirements Engineering Conference (RE'13)*, Rio de Janeiro, Brazil, September 2013.

Book Editor, IAPP Certification for Information Privacy Professionals for Information Technology Course Textbook, expected 2013.

Program Board Member, *20<sup>th</sup> IEEE International Requirements Engineering Conference (RE'12)*, Chicago, Illinois, September 2012.

Publicity Chair, *20<sup>th</sup> IEEE International Requirements Engineering Conference (RE'12)*, Chicago, Illinois, September 2012.

Organizing Co-Chair, *5<sup>th</sup> International Workshop on Requirements Engineering and Law (RELAW'12)*, co-located with RE'12, Chicago, Illinois, September 2012.

Program Committee Member, *Foundations on Software Engineering, New Ideas (FSE'10)*, Szeged, Hungary, September 2011.

Program Committee Member, *19<sup>th</sup> International Requirements Engineering Conference (RE'11)*, Trento, Italy, September 2011.

Tutorials Co-Chair, *19<sup>th</sup> International Requirements Engineering Conference (RE'11)*, Trento, Italy, September 2011.

Organizing Co-Chair, *4<sup>th</sup> International Workshop on Requirements Engineering and Law (RELAW'11)*, co-located with RE'11, Trento, Italy, September 2011.

Program Committee Member, *4<sup>th</sup> International Workshop on Managing Requirements Knowledge (MaRK'11)*, Trento, Italy, September 2011.

Program Co-Chair, *Security and Privacy Requirements Engineering (SPREE)*, Software Engineering Institute, Pittsburgh, Pennsylvania, June 2011.

Program Committee Member, *1<sup>st</sup> Workshop on the Web and Requirements Engineering (WeRE'10)*, Sydney, Australia, September 2010.

Program Committee Member, *18<sup>th</sup> International Requirements Engineering Conference (RE'10)*, Sydney, Australia, September 2010.

Publications Chair, *18<sup>th</sup> International Requirements Engineering Conference (RE'10)*, Sydney, Australia, September 2010.

Program Co-Chair, *3<sup>rd</sup> International Workshop on Requirements Engineering and Law (RELAW'10)*, co-located with RE'10, Sydney, Australia, September 2010.

Guest Editor, Requirements Engineering Journal, Special Issue on Digital Privacy: Theories, Policies and Technologies, Springer, 2010.

Program Committee Co-chair, *2<sup>nd</sup> International Workshop on Requirements Engineering and Law (RELAW'09)*, co-located with RE'09, Atlanta, Georgia, September 8<sup>th</sup>, 2009.

Program Committee Member, *Workshop on Information Security and Privacy in a De-Perimeterised World (DISP-09)*, co-located with PASSAT'09, Vancouver, Canada, August 29-30, 2009.

Program Committee Member, *6<sup>th</sup> International Conference on Trust, Privacy and Security (TrustBus '09)*, Linz, Austria, August 31-September 4, 2009.

Program Committee Member, *IEEE 6<sup>th</sup> International Conference on Information Technology (ITNG '09)*, Software Compliance Track, Las Vegas, Nevada, USA, April 27-29, 2009.

Program Committee Co-chair, *1<sup>st</sup> International Workshop on Requirements Engineering and Law (RELAW'08)*, co-located with RE'08, Barcelona, Spain, September 8<sup>th</sup>, 2008.

Program Committee Member, *Workshop on Security and Privacy in Wireless Mobility*, co-located with *IEEE WiMob*, Avignon, France, October 12<sup>th</sup> 2008.

Program Committee Member, *Symposium on Requirements Engineering for Information Security (SREIS'08)*, co-located with *ARES'08*, Barcelona, Spain, March 4-7<sup>th</sup> 2008.

Organizing Committee Member, *Preparing the Faculty Candidate: Recruiter and New Faculty Perspectives*, North Carolina State University, Raleigh, NC, November 13<sup>th</sup> 2007.

Steering Committee Member, *Land Grant University Research Ethics Program*, North Carolina State University, Raleigh, North Carolina, USA, 2006–2007.

## Invited Referee and Reviewer Participation

---

Associate Editor, ACM Transactions on Software Engineering and Methodology (ACM TOSEM), 2019-2023.

Reviewer, Empirical Software Engineering Journal, since 2022.

Reviewer, Software and Systems Modeling, since 2020, voted in top 1% of best reviewers in 2021.

Reviewer, ACM Transactions on Software Engineering and Methodology (ACM TOSEM), since 2011.

Reviewer, ACM Transactions on the Web, since 2010.

Reviewer, Automated Software Engineering Journal (ASEJ), since 2010.

Reviewer, Enterprise Information Systems, since 2010.

Reviewer, IEEE Security & Privacy, since 2009.

Reviewer, Requirements Engineering Journal (REJ), since 2008.

Reviewer, Communications of the ACM (CACM), since 2008.

Reviewer, Elsevier Computer Standards and Interfaces, since 2008.

Reviewer, IEEE Transactions on Knowledge and Data Engineering (IEEE TKDE), since 2007.

Reviewer, Elsevier Computers and Security, since 2007.

Reviewer, Grace Hopper Celebration of Women in Computing Conference, 2006.

Reviewer, IEEE Transactions on Software Engineering (IEEE TSE), since 2005.

## Book Chapters

---

**B1. Engineering Privacy**, Stuart Shapiro, Travis D. Breaux. In Introduction to IT Privacy: A Handbook for Technologists, 3rd Edition, IAPP, Expected September 2024.

**B2. Interference**, Travis D. Breaux, Aaron Massey. In Introduction to IT Privacy: A Handbook for Technologists, 3rd Edition, IAPP, Expected September 2024.

**B3. Engineering Privacy**, Travis D. Breaux, Stuart Shapiro, David Gordon. In Introduction to IT Privacy: A Handbook for Technologists, 2<sup>nd</sup> Edition, IAPP, December 2019, ISBN: 978-0-9885525-5-5.

**B4. Ensuring Privacy in the Clouds**. Travis D. Breaux and Siani Pearson, In *Encyclopedia of Cloud Computing*, San Murugesan and Irena Bojanova (eds.), Wiley-IEEE, ISBN: 978-1118821978, 2015.

**B5. Engineering Privacy**, Travis D. Breaux, Stuart Shapiro, David Gordon. In Introduction to IT Privacy: A Handbook for Technologists, IAPP, May 2013, ISBN: 978-0-9885525-5-5.

**B6. Interference**, in the IAPP Certification for Information Privacy Professionals. Aaron Massey, Travis D. Breaux. In Introduction to IT Privacy: A Handbook for Technologists, IAPP, May 2013, ISBN: 978-0-9885525-5-5.

## Refereed Journal Publications

---

- J1. Extracting Stakeholder Preferences from Scenarios.**  
Yuchen Shen, Travis D. Breaux. *IEEE Transactions on Software Engineering*, pp. 69-84, vol. 50, January 2024.
- J2. Consent Verification Monitoring.**  
Marco Robol, Travis D. Breaux, Elda Paja, Paolo Giorgini, *ACM Transactions on Software Engineering Methodology*, February 22, 2023.
- J3. DAISY: Dynamic-Analysis-Induced Source Discovery for Sensitive Data.**  
Xueling Zhang, John Heaps, Rocky Slavin, Jianwei Niu, Travis D. Breaux, and Xiaoyin Wang. *ACM Trans. Softw. Eng. Methodol.*, Accepted: October 2022.
- J4. A Systemic Approach for Natural Language Scenario Elicitation of Security Requirements.**  
Hanan Hibshi, Stephanie Jones, Travis Breaux. *IEEE Transactions on Dependable and Secure Computing*, pp. 1-13, 2022.
- J5. Analyzing privacy policies through syntax-driven semantic analysis of information types.**  
Mitra Bokaei Hosseini, Travis D. Breaux, Rocky Slavin, Jianwei Niu, Xiaoyin Wang: *Information & Software Technology* 138: 106608 (2021)
- J6. Identifying incompleteness in privacy policy goals using semantic frames.**  
Jaspreet Bhatia, Morgan C. Evans, Travis D. Breaux, *Requirements Engineering Journal*, 24(3): 291-313. 2019.
- J7. RSL-IL4Privacy: a domain-specific language for the rigorous specification of privacy policies.**  
João Caramujo, Alberto Rodrigues da Silva, Shaghayegh Monfared, André Ribeiro, Pável Calado, Travis D. Breaux, *Requirements Engineering Journal*, 24(1): 1-26, 2019.
- J8. Empirical Measurement of Perceived Privacy Risk**  
Jaspreet Bhatia, Travis Breaux. *ACM Transactions on Human Computer Interaction*, 25(6): 34:1-34:47 (2018)
- J9. A Grounded Analysis of Experts' Decision-Making During Security Assessments**  
Hanan Hibshi, Travis Breaux, Maria Riaz, and Laurie Williams. *Journal of Cybersecurity*, Oxford Press, (2)2: 147-163, 2016.
- J10. Ambiguity in Privacy Policies and the Impact of Regulation**  
Joel R. Reidenberg, Jaspreet Bhatia, Travis D. Breaux, and Thomas B. Norton, (**Honorable Mention in 7<sup>th</sup> Annual Papers for Policy Makers Award**) *Journal of Legal Studies*, 45(S2): pp. S163-S190, 2016.
- J11. Privacy Goal Mining through Hybridized Task Re-composition**  
Jaspreet Bhatia, Travis D. Breaux, Florian Schaub. *ACM Transactions on Software Engineering Methodology*, 25(3): Article 22, 2016.
- J12. How Have We Evaluated Software Patterns in Problem Solving? A Systematic Mapping Study of Research Design Practices**  
Maria Riaz, Travis Breaux, Laurie Williams. *Information and Software Technology*, v. 65, Elsevier, 2015.
- J13. Eddy, A Formal Language for Specifying and Analyzing Data Flow Specifications for Conflicting Privacy Requirements.**  
Travis D. Breaux, Hanan Hibshi, Ashwini Rao. *Requirements Engineering Journal (REJ)*, 19(3): 281-307 (2014).
- J14. A Cross-Domain Empirical Study and Legal Evaluation of the Requirements Water Marking Method**  
David G. Gordon, Travis D. Breaux. *Requirements Engineering Journal (REJ)*, 18(2): 147-173, 2013.
- J15. Legally "Reasonable" Security Requirements: A 10-year FTC Retrospective.**  
Travis D. Breaux, David L. Baumer. *Computers and Security (COSE)*, November 2010, pp. 178-193.

- J16. IT Compliance: Aligning Legal and Product Requirements.**  
Travis D. Breaux, Annie I. Anton, Kent Boucher, Merlin Dorfman. *IT Professional*, 11(5): 54-58, September/October 2009.
- J17. A Distributed Requirements Management Framework for Compliance and Accountability.**  
Travis D. Breaux, Annie I. Antón, Eugene H. Spafford. *Computers and Security (COSE)*, 28(1-2): 8-17, February/March 2009.
- J18. Semantic Parameterization: A Conceptual Modeling Process for Domain Descriptions.**  
Travis D. Breaux, Annie I. Antón, Jon Doyle. *ACM Transactions on Software Engineering Methodology (ACM TOSEM)*, 18(2): 5, November 2008.
- J19. Analyzing Regulatory Rules for Privacy and Security Requirements.**  
Travis D. Breaux, Annie I. Antón. *IEEE Transactions on Software Engineering (IEEE TSE)*, Special Issue on *Software Engineering in Secure Systems*, 34(1): 5-20, January/February 2008.

## Refereed Conference Proceedings

---

- C1. Requirements Satisfiability with In-Context Learning**  
Sarah Santos, Travis Breaux, Tom Norton, Sara Haghighi and Sepideh Ghanavati. **(Distinguished Paper/ Challenge Award)** *31<sup>st</sup> IEEE Requirements Engineering Conference*, 2024.
- C2. Mobile Application Privacy Risk Assessments from User-authored Scenarios.**  
Tianjian Huang, Vaishnavi Kaur, Travis D. Breaux, Mitra Bokaei Hosseini. *30<sup>th</sup> IEEE International Conference on Requirements Engineering*, pp. 17-28, 2023.
- C3. A Metric for Measuring Software Engineering Post-Graduate Outcomes.**  
Travis D. Breaux, Jennifer Moritz. *45<sup>th</sup> ACM/IEEE International Conference on Software Engineering*, pp. 283-295, 2023.
- C4. Legal Accountability as Software Quality: A U.S. Data Processing Perspective.**  
Travis D. Breaux, Thomas B. Norton. **(Distinguished Paper)** *29<sup>th</sup> IEEE International Requirements Engineering Conference (RE'22)*, pp. 101-113, 2022.
- C5. Ambiguity and Generality in Natural Language Privacy Policies.**  
Mitra Bokaei Hosseini, John Heaps, Rocky Slavin, Travis Breaux, Jianwei Niu. *29<sup>th</sup> IEEE International Requirements Engineering Conference*, pp. 70-81, 2021.
- C6. How Does Misconfiguration of Analytic Services Compromise Mobile Privacy?**  
Xueling Zhang, Xiaoyin Wang, Rocky Slavin, Travis D. Breaux, and Jianwei Niu. *42<sup>nd</sup> ACM/IEEE International Conference on Software Engineering (ICSE)*, 2020, pp. 1572-1583.
- C7. Disambiguating Requirements through Syntax-Driven Semantic Analysis of Information Types.**  
Mitra Bokaei Hosseini, Mitra Bokaei Hosseini, Rocky Slavin, Travis D. Breaux, Xiaoyin Wang, and Jianwei Niu. *26<sup>th</sup> International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, 2020, 97-115.
- C8. Toward Detection of Access Control Models from Source Code via Word Embedding.**  
John Heaps, Xiaoyin Wang, Travis D. Breaux, Jianwei Niu, *24<sup>th</sup> ACM Symposium on Access Control Models and Technologies (SACMAT)*, pp. 103-112, 2019.
- C9. Consent Verification Under Evolving Privacy Policies.**  
Marco Robol, Travis D. Breaux, Elda Paja, Paolo Giorgini, *27<sup>th</sup> IEEE International Requirements Engineering Conference (RE'19)*, Jeju Island, South Korea, pp. 422-427, 2019.
- C10. Semantic Agreement among Stakeholder Interpretations of Logical Hyponymy**  
Morgan C. Evans, Dominic Contreras, Travis D. Breaux. In Submission: *27<sup>th</sup> IEEE International Requirements Engineering Conference (RE'19)*, Jeju Island, South Korea, 2019.
- C11. Systematic Scenario Creation for Requirements Elicitation, Validation and Analysis**  
Hanan Hibshi, Stephanie Jones, Travis D. Breaux. In Submission: *27<sup>th</sup> IEEE International Requirements Engineering Conference (RE'19)*, Jeju Island, South Korean, 2019.



- C12. Semantic Incompleteness in Privacy Policy Goals**  
Jaspreet Bhatia, Travis D. Breaux. **(Distinguished Paper Award)** 26<sup>th</sup> *IEEE International Requirements Engineering Conference (RE'18)*, Banff, Canada, pp. 159-169, 2018.
- C13. GUILeak: Tracing Privacy Policy Claims on User Input Data for Android Applications**  
Xiaoyin Wang, Xue Qin, Mitra Bokaei Hosseini, Rocky Slavin, Travis D. Breaux, Jianwei Niu. 40<sup>th</sup> *International Conference on Software Engineering (ICSE'18)*, Gothenberg, Sweden, pp. 37-47, 2018.
- C14. Inferring Ontology Fragments from Semantic Typing of Lexical Variants.**  
Mitra Bokaei Hosseini, Travis D. Breaux, Jianwei Niu. 24<sup>th</sup> *International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ'18)*, Utrecht, Netherlands, pp. 39-56, 2018.
- C15. Reinforcing Security Requirements with Multifactor Quality Measurement.**  
Hanan Hibshi, Travis D. Breaux. 25<sup>th</sup> *IEEE International Requirements Engineering Conference (RE'17)*, Lisbon, Portugal, pp. 144-153, 2017.
- C16. An Evaluation of Constituency-based Hyponymy Extraction from Privacy Policies.**  
Morgan C. Evans, Jaspreet Bhatia, Sudarshan Wadkar, Travis D. Breaux. 25<sup>th</sup> *IEEE International Requirements Engineering Conference (RE'17)*, Lisbon, Portugal, pp. 312-321, 2017.
- C17. Improved Cyber Threat Indicator Sharing by Scoring Privacy Risk.**  
Daniel M. Best, Jaspreet Bhatia, Elena S. Peterson and Travis D. Breaux, 2017 *IEEE International Symposium on Technologies for Homeland Security (HST)*, Waltham, MA, USA, pp. 1-5, doi: 10.1109/THS.2017.7943482.
- C18. Improving Security Requirements Adequacy: an Interval Type 2 Fuzzy Logic Security Assessment System.**  
Hanan Hibshi, Travis D. Breaux, Christian Wagner. *IEEE Symposium Series on Computational Intelligence (SSCI'16)*, Athens, Greece, pp. 1-8, 2016.
- C19. Towards a Theory of Vagueness and Privacy Risk Perception in Privacy Policies.**  
Jaspreet Bhatia, Travis Breaux, Joel Reidenberg, Thomas Norton. **(Nominated for Best Paper)**. 24<sup>th</sup> *IEEE International Requirements Engineering Conference*, 2016.
- C20. Toward a Framework for Detecting Privacy Policy Violation in Android Application Code**  
Rocky Slavin, Xiaoyin Wang, Mitra Bokaei Hosseini, William Hester, Ram Krishnan, Jaspreet Bhatia, Travis D. Breaux, Jianwei Niu. *ACM/IEEE 38th International Software Engineering Conference*, Austin, Texas, pp. 25-35, 2016.
- C21. Assessment of Risk Perception in Security Requirements Composition**  
Hanan Hibshi, Travis Breaux, Stephen Broomell. 23<sup>rd</sup> *IEEE International Requirements Engineering Conference*, Ottawa, Canada, pp. 146-155, 2015.
- C22. Detecting Repurposing and Over-Collection in Multi-Party Privacy Specifications**  
Travis Breaux, Daniel Smullen, Hanan Hibshi. 23<sup>rd</sup> *IEEE International Requirements Engineering Conference*, Ottawa, Canada, pp. 166-175, Sep. 2015.
- C23. Scaling Requirements Extraction to the Crowd: Experiments on Privacy Policies**  
Travis Breaux, Florian Schaub. 22<sup>nd</sup> *IEEE International Requirements Engineering Conference*, Karlskrona, Sweden, 2014, pp. 163-172.
- C24. Modeling Security Requirements Expertise: Understanding Security Experts' Decision Making**  
Hanan Hibshi, Travis Breaux, Maria Riaz, Laurie Williams. In Submission: 11<sup>th</sup> *Symposium on Usable Privacy and Security*, Ottawa, Canada 2015.
- C25. Managing Security Requirements Patterns Using Feature Diagram Hierarchies**  
Rocky Slavin, Jean-Michel Lehker, Jianwei Niu, Travis Breaux. 22<sup>nd</sup> *IEEE International Requirements Engineering Conference*, Karlskrona, Sweden, 2014, pp. 193-202.
- C26. The Role of Legal Expertise in Interpretation of Legal Requirements and Definitions**  
David G. Gordon, Travis D. Breaux. 22<sup>nd</sup> *IEEE International Requirements Engineering Conference*, Karlskrona, Sweden, 2014, pp. 273-282.

- C27. Less is More? Investigating the Role of Examples in Security Studies using Analogical Transfer**  
Ashwini Rao, Hanan Hibshi, Travis Breaux, Jean-Michel Leher and Jianwei Niu, *2014 Symposium and Bootcamp in the Science of Security (HotSoS)*, April, 2014, Article No. 7.
- C28. Assessing Regulatory Change through Legal Requirements Coverage Modeling**  
David G. Gordon, Travis D. Breaux, *21<sup>st</sup> IEEE International Requirements Engineering Conference*, Rio de Janeiro, 2013, pp. 145-154.
- C29. Formal Analysis of Privacy Requirements Specifications for Multi-Tier Applications**  
Travis D. Breaux, Ashwini Rao, **(Nominated for Best Paper)** *21<sup>st</sup> IEEE International Requirements Engineering Conference*, Rio de Janeiro, 2013, pp. 14-23.
- C30. Regulatory Requirements Traceability and Analysis Using Semi-Formal Specifications**  
Travis D. Breaux, David G. Gordon, *19<sup>th</sup> Working Conference on Requirements Engineering: Foundations for Software Quality (REFSQ'13)*, Essen, Germany, Apr. 2013, pp. 141-157
- C31. Reconciling Multi-Jurisdictional Legal Requirements: A Case Study in Requirements Water Marking**  
David G. Gordon, Travis D. Breaux, **(Nominated for Best Paper)** *20<sup>th</sup> IEEE International Conference on Requirements Engineering*, Chicago, Illinois, Sep. 2012, pp. 91-100
- C32. Towards a Privacy Management Framework for Distributed Cybersecurity in the New Data Ecology**,  
Travis D. Breaux, Catherine B. Lotrionte. *IEEE International Conference on Technologies for Homeland Security (HST'11)*, Waltham, Massachusetts, November 2011, pp. 6-12
- C33. Exercising Due Diligence in Legal Requirements Acquisition**  
Travis D. Breaux. In Proc. *17<sup>th</sup> International Requirements Engineering Conference (RE'09)*, Atlanta, Georgia, September 2009, pp. 225-230.
- C34. Early Studies in Acquiring Evidentiary, Reusable Business Process Models for Legal Compliance**  
Travis D. Breaux, Calvin Powers. In Proc. *6<sup>th</sup> International Conference on Information Technology: New Generations (ITNG'09)*, Las Vegas, NV, April 2009, pp. 272-277.
- C35. Automating the Extraction of Rights and Obligations for Regulatory Compliance**  
Nadzeya Kiyavitskaya, Nicola Zeni, Travis D. Breaux, Annie I. Antón, James R. Cordy, Luisa Mich, John Mylopoulos. In Proc. *27<sup>th</sup> International Conference on Conceptual Modelling (ER'08)*, Barcelona, Spain, October 2008, pp. 154-168.
- C36. Legal Requirements, Compliance and Practice: An Industry Case Study in Accessibility**  
Travis D. Breaux, Annie I. Antón, Kent Boucher, Merlin Dorfman. In Proc. *IEEE 16<sup>th</sup> International Requirements Engineering Conference (RE'08)*, Barcelona, Catalonia, Spain, September 2008, pp. 43-52.
- C37. Identifying Vulnerabilities and Critical Requirements using Criminal Court Proceedings**  
Travis D. Breaux, Jonathan D. Lewis, Paul N. H. Otto, Annie I. Antón. In Proc. *ACM Symposium on Applied Computing (ACM SAC'09)*, Honolulu, Hawaii, August 2008, pp. 355-359.
- C38. Extracting Rights and Obligations from Regulations: Towards a Tool-Supported Process**  
Nadzeya Kiyavitskaya, Nicola Zeni, Luisa Mich, Travis D. Breaux, Annie I. Antón, John Mylopoulos  
In Proc. *IEEE/ACM 22nd International Conference Automated Software Engineering (ASE'07)*, Atlanta, Georgia, November 2007, pp. 429-432.
- C39. Towards Compliance: Extracting Rights and Obligations to Align Requirements with Regulations**  
Travis D. Breaux, Matthew W. Vail, Annie I. Antón. In Proc. *IEEE 14<sup>th</sup> International Requirements Engineering Conference (RE'06)*, Minneapolis, MN, USA, September 2006, pp. 49-58. **(Honorable Mention for RE 2016 Most Influential Paper Award)**
- C40. Analyzing Goal Semantics for Rights, Permissions and Obligations**  
Travis D. Breaux, Annie I. Antón. In Proc. *13<sup>th</sup> IEEE International Requirements Engineering Conference (RE'05)*, Paris, France, August 2005, pp. 177-186.
- C41. Hierarchical Information Clustering Using Ontology Languages**  
Travis D. Breaux and Joel Reed. In Proc. *38<sup>th</sup> Hawaii International Conference on System Sciences (HICSS-38)*, Honolulu, Hawaii, January 2005, p. 112b.

---

**Refereed Workshop Proceedings**

---

- W1. Patterns of Inquiry in a Community Forum for Legal Compliance with Privacy Law.** Sarah Santos, Sara Haghighi, Sepideh Ghanavati, Travis Breaux, and Tom Norton, *11<sup>th</sup> International Workshop on Evolving Security and Privacy Requirements Engineering (ESPRE)*, 2024.
- W2. Domain Model Extraction from User-authored Scenarios and Word Embeddings.** Yuchen Shen, Travis D. Breaux, *9th International Workshop on Artificial Intelligence and Requirements Engineering (AIRE'22)*, pp. 143-151, 2022.
- W3. A Data Purpose Case Study of Privacy Policies.** Jaspreet Bhatia, Travis D. Breaux. *RE:Next! Track in the 25<sup>th</sup> IEEE International Requirements Engineering Conference*, pp. 394-399, 2017.
- W4. Lexical Similarity of Information Type Hypernyms, Meronyms and Synonyms in Privacy Policies.** Mitra Bokaei Hosseini, Sudarshan Wadkar, Travis D. Breaux, Jianwei Niu. *AAAI Fall Symposium on Privacy and Language Technologies (PLT)*, Arlington, Virginia, Nov. 2016.
- W5. Privacy Risk in Cybersecurity Data Sharing.** Jaspreet Bhatia, Travis D. Breaux, Liora Friedberg, Hanan Hibshi, Daniel Smullen. *ACM 3rd International Workshop on Information Sharing and Collaborative Security (WISCS)*, Vienna, Austria, Oct. 2016.
- W6. Automated Extraction of Regulated Information Types using Hyponymy Relations.** Jaspreet Bhatia, Morgan Evans, Sudarshan Wadkar, Travis D. Breaux. *IEEE 3rd International Workshop on Artificial Intelligence for Requirements Engineering (AIRE)*, Beijing, China, Aug. 2016.
- W7. Towards an Information Type Lexicon for Privacy Policies** Jaspreet Bhatia, Travis D. Breaux, *8<sup>th</sup> IEEE International Workshop on Requirements Engineering and Law*, Ottawa, Canada, 2015, pp. 19-24.
- W8. Comparing and Analyzing Definitions in Multi-Jurisdictions** Sepideh Ghanavati, Travis D. Breaux, *8<sup>th</sup> IEEE International Workshop on Requirements Engineering and Law*, Ottawa, Canada, 2015, pp. 47-56.
- W9. Towards a framework to measure security expertise in requirements analysis.** Hanan Hibshi, Travis D. Breaux, Maria Riaz, Laurie A. Williams, *1<sup>st</sup> Evolving Security & Privacy Requirements Engineering Workshop*, Karlskrona, Sweden, August 25, 2014, pp. 13-18.
- W10. Mapping Legal Requirements to IT Controls** Travis Breaux, David Gordon, Nick Papanikolaou and Siani Pearson, *6<sup>th</sup> IEEE International Workshop on Requirements Engineering and Law (RELAW'13)*, Rio de Janeiro, July 2013, pp. 11-20.
- W11. Toward Benchmarks to Assess Advancement in Legal Requirements Modeling** Ivan Jureta, Travis Breaux, Alberto Siena and David Gordon. *6<sup>th</sup> IEEE International Workshop on Requirements Engineering and Law (RELAW'13)*, Rio de Janeiro, July 2013, pp. 25-33.
- W12. Towards a Framework for Pattern Experimentation: Understanding empirical validity in requirements engineering patterns** Travis D. Breaux, Hanan Hibshi, Ashwini Rao, Jean-Michel Lehjker. *2<sup>nd</sup> International Workshop on Requirements Patterns*, Chicago, Illinois, September 2012, pp. 41-47.
- W13. Managing Multi-Jurisdictional Requirements in the Cloud.** David G. Gordon, Travis D. Breaux. *3rd ACM Cloud Computing Security Workshop (CCSW'11)*, Chicago, Illinois, October 2011, pp. 83-94.
- W14. Comparing Requirements from Multiple Jurisdictions.** David G. Gordon, Travis D. Breaux. *4th IEEE International Workshop on Requirements Engineering and Law (RELAW'11)*, Trento, Italy, August 2011, pp. 43-49.
- W15. Governance and Accountability in the New Data Ecology: A Vision for Electronic Data Licenses.** Travis D. Breaux, Thomas A. Alspaugh. *4th IEEE International Workshop on Requirements Engineering and Law (RELAW'11)*, Trento, Italy, Aug. 2011, pp. 5-14.

**W16. A Method to Acquire Compliance Monitors from Regulations**

Travis D. Breaux. In Proc. *3<sup>rd</sup> IEEE International Workshop on Requirements Engineering and Law (RELAW'10)*, Sydney, Australia, September 2010, pp. 17-26.

**W17. A Systematic Method for Acquiring Regulatory Requirements: A Frame-based Approach**

Travis D. Breaux, Annie I. Antón. In Proc. *6<sup>th</sup> International Workshop on Requirements for High Assurance Systems (RHAS-6)*, Delhi, India, October 2007.

**W18. Compliance Engineering: Aligning Software Requirements with Policies and Regulations**

Travis D. Breaux. *ACM/SIGSOFT 14<sup>th</sup> Symposium on Foundations of Software Engineering (FSE-14), Doctoral Symposium*, Portland, OR, USA, November 2006.

**W19. Enforceability vs. Accountability in Electronic Policies**

Travis D. Breaux, Annie I. Antón, Clare-Marie Karat, John Karat. In Proc. *IEEE 7<sup>th</sup> International Workshop on Policies for Distributed Systems and Networks (POLICY'06)*, London, ON, Canada, June 2006, pp. 227–230.

**W20. Mining Rule Semantics for Understanding Legislative Compliance**

Travis D. Breaux, Annie I. Antón. In Proc. *ACM Workshop on Privacy in the Electronic Society (WPES'05)*, Alexandria, VA, USA, November 2005, pp. 51–54.

**W21. Deriving Semantic Models from Privacy Policy Goals**

Travis D. Breaux, Annie I. Antón. In Proc. *IEEE 6<sup>th</sup> International Workshop on Policies for Distributed Systems and Networks (POLICY'05)*, Stockholm, Sweden, June 2005, pp. 67–76.

**Invited Papers, Technical Reports and Theses**

---

**T1. Managing Risk in Mobile Applications with Formal Security Policies**

Travis D. Breaux, Ashwini Rao. Invited Paper: *10<sup>th</sup> Annual Acquisition Research Symposium*, Naval Postgraduate School, March 21, 2013.

**T2. Regulatory Requirements as Open Systems: Structures, Patterns and Metrics for the Design of Formal Requirements Specifications**

Travis D. Breaux, David G. Gordon. CMU Technical Report #ISR-11-100, February 25, 2011

**T3. Legal Requirements Acquisition for the Specification of Legally Compliance Information Systems**

Travis D. Breaux, Ph.D. Dissertation, NC State University, April 22<sup>nd</sup> 2009. Advisor: Annie I. Antón

**T4. Acquiring Software Compliance Artifacts from Policies and Regulations**

Travis D. Breaux, Annie I. Antón, Technical Report #TR-2006-27, North Carolina State University, Department of Computer Science, September 8<sup>th</sup> 2006.

**T5. Policy-Parametric Software**

Travis D. Breaux, Technical Report #TR-2004-30, North Carolina State University, Department of Computer Science, November 17<sup>th</sup> 2004.

**Academic Paper Presentations**

---

**P1. Empirical Measurement of Perceived Privacy Risk**

Jaspreet Bhatia and Travis D. Breaux, *Privacy Law Scholars Conference*, Berkeley, June 1, 2017.

**P2. Scaling Requirements Extraction to the Crowd: Experiments with Privacy Policies**

Travis D. Breaux, *IEEE 22<sup>nd</sup> International Requirements Engineering Conference*, August 28, 2014

**P3. The Role of Legal Expertise in Interpretation of Legal Requirements and Definitions**

Travis D. Breaux, *IEEE 22<sup>nd</sup> International Requirements Engineering Conference*, August 29, 2014

**P4. Formal Analysis of Privacy Requirements Specifications for Multi-Tier Applications**

Travis D. Breaux, *IEEE 21<sup>st</sup> International Requirements Engineering Conference*, July 17, 2013

- P5. Tracing Regulatory Requirements using Formal Specification Languages**  
Travis D. Breaux, *19<sup>th</sup> Working Conference on Requirements Engineering: Foundations for Software Quality (REFSQ'13)*, April 9, 2013
- P6. Towards a Privacy Management Framework for Distributed Cybersecurity in the New Data Ecology**  
Travis D. Breaux, *IEEE International Conference on Technologies for Homeland Security (HST'11)*, Waltham, Massachusetts, November 15, 2011.
- P7. Governance and Accountability in the New Data Ecology: A Vision for Electronic Data Licenses.**  
Travis D. Breaux, *4<sup>th</sup> IEEE International Workshop on Requirements Engineering and Law (RELAW'11)*, Trento, Italy, August 30, 2011.
- P8. A Method to Acquire Compliance Monitors from Regulations**  
Travis D. Breaux, *3<sup>rd</sup> IEEE International Workshop on Requirements Engineering and Law (RELAW'10)*, Sydney, Australia, September 28<sup>th</sup>, 2010.
- P9. Exercising Due Diligence in Legal Requirements Acquisition**  
Travis D. Breaux, *17<sup>th</sup> International Requirements Engineering Conference (RE'09)*, Atlanta, Georgia, September 2<sup>nd</sup>, 2009.
- P10. Early Studies in Acquiring Evidentiary, Reusable Business Process Models for Legal Compliance**  
Travis D. Breaux, *6<sup>th</sup> International Conference on Information Technology: New Generations (ITNG'09)*, Las Vegas, NV, April 27<sup>th</sup> 2009.
- P11. Legal Requirements Acquisition for the Specification of Legally Compliance Information Systems**  
Travis D. Breaux, *Doctoral Thesis Defense*, North Carolina State University, Raleigh, North Carolina, February 2<sup>nd</sup> 2009.
- P12. Legal Requirements, Compliance and Practice: An Industry Case Study in Accessibility**  
Travis D. Breaux, *IEEE 16<sup>th</sup> International Requirements Engineering Conference (RE'08)*, Barcelona, Catalonia, Spain, September 10<sup>th</sup> 2008.
- P13. A Systematic Method for Acquiring Regulatory Requirements: A Frame-based Approach**  
Travis D. Breaux, *6<sup>th</sup> International Workshop on Requirements for High Assurance Systems (RHAS-6)*, Delhi, India, October 15<sup>th</sup> 2007.
- P14. The Frame-Based Requirements Analysis Method (FBRAM)**  
Travis D. Breaux, *Doctoral Thesis Proposal*, North Carolina State University, Raleigh, NC, USA, August 17<sup>th</sup> 2007.
- P15. Compliance Engineering: Aligning Software Requirements with Policies and Regulations**  
Travis D. Breaux, *ACM/SIGSOFT 14<sup>th</sup> Symposium on Foundations of Software Engineering (FSE-14), Doctoral Symposium*, Portland, OR, USA, November 6<sup>th</sup> 2006.
- P16. Towards Compliance: Extracting Rights and Obligations to Align Requirements with Regulations**  
Travis D. Breaux, *IEEE 14<sup>th</sup> International Requirements Engineering Conference (RE'06)*, Minneapolis, MN, USA, September 13<sup>th</sup> 2006.
- P17. Enforceability vs. Accountability in Electronic Policies**  
Travis D. Breaux, *IEEE 7<sup>th</sup> International Workshop on Policies for Distributed Systems and Networks*, London, Ontario, June 8<sup>th</sup> 2006.
- P18. Mining Rule Semantics for Understanding Legislative Compliance**  
Travis D. Breaux, *2005 ACM Workshop on Privacy in Electronic Society*, Alexandria, Virginia, November 7<sup>th</sup> 2005.
- P19. Analyzing Goal Semantics for Rights, Permissions and Obligations**  
Travis D. Breaux, *13<sup>th</sup> IEEE Requirements Engineering Conference*, Paris, France, September 1<sup>st</sup> 2005.
- P20. Deriving Semantic Models from Privacy Policies**  
Travis D. Breaux, *IEEE 6<sup>th</sup> International Workshop on Policies for Distributed Systems and Networks*, Stockholm, Sweden, June 6<sup>th</sup> 2005.
- P21. Rights, Obligations and Suggestions: Encoding Rules from Privacy Law**

Travis D. Breaux, *The PrivacyPlace Spring 2005 Workshop*, Department of Computer Science, North Carolina State University, Raleigh, North Carolina, March 14<sup>th</sup> 2005.

**P22. Semantic Parameterization of Privacy Goals**

Travis D. Breaux, *The Privacy Place Fall 2004 Workshop*, Department of Computer Science, North Carolina State University, Raleigh, North Carolina, October 19<sup>th</sup> 2004.

---

## Invited Presentations

---

**P23. Engineering with Large Language Models**

Travis D. Breaux, Oak Ridge National Laboratory, March 22, 2024

**P24. Generative AI, risks and opportunities: How to make software more accountable to law and society (Keynote)**

Travis D. Breaux, Pittsburgh Intellectual Property Law Association, January 17, 2024

**P25. Consent Management at-scale under Rapidly Evolving Data Practices**

Travis D. Breaux, University of Gothenburg, Gothenburg, Sweden, June 13, 2023.

**P26. Robust Consent Monitoring and Verification for Privacy-by-Design**

Travis D. Breaux, Smith College, Massachusetts, United States, March 30, 2023.

**P27. What Are We Afraid Of? Quantifying Risk in Privacy and Security (Keynote)**

Travis D. Breaux, *8<sup>th</sup> International Workshop on Evolving Security & Privacy Requirements Engineering*, September 21, 2021.

**P28. The Ontology of Personal Information (Keynote)**

Travis D. Breaux, PrivateNLP, collocated with North American Chapter of the Association for Computational Linguistics (NAACL), June 11, 2021.

**P29. Consent Analysis under General Data Protection Regulation**

Travis D. Breaux, IFIP WG2.9, Panama City, Panama, February 12, 2020.

**P30. Verifying Consent in Privacy and Data-Intensive Systems.**

Travis D. Breaux, University of Nottingham, United Kingdom, July 30, 2019.

**P31. Engineering Privacy through Integrated Policy and Source Code Analysis**

Travis D. Breaux, University of Trento, Trento, Italy, September 6, 2018

**P32. Determinism and Legal Ambiguity: Making Computational Sense of Policy and Law**

Travis D. Breaux, University of Maryland, College Park, April 24, 2018

**P33. Information Designations for Privacy**

Travis D. Breaux, IFIP Working Group 2.9 Meeting, Guanacaste, Costa Rica, February 21, 2018.

**P34. Engineering Privacy through Integrated Policy and Source Code Analysis**

Travis D. Breaux, SnT – University of Luxembourg, Luxembourg, January 16, 2018.

**P35. Empirical Measurement of Perceived Privacy Risk**

Travis D. Breaux, National Institute of Standards and Technology (NIST), June 9, 2017.

**P36. Privacy Requirements Engineering: Methods and Research Challenges**

Travis D. Breaux, Workshop on Privacy by Design Beyond the Screen, Lorentz@Snellius, Leiden, Netherlands, April 26, 2017.

**P37. Privacy Impacts of Industry Sharing Cybersecurity Indicators with (US) Government Entities**

Travis D. Breaux, *North Atlantic Treaty Organization (NATO), Science and Technology Organization Lecture Series IST-143 on Cyber Security Science and Engineering*, Washington, D.C., November 8, 2016

**P38. Information Sharing in the Age of Digital Privacy**

Travis D. Breaux, *Intelligence Community Academic Research Symposium*, September 21, 2016

- P39. Privacy Risk: A Measurement Misnomer?**  
Travis D. Breaux, *IFIP WG 2.9 on Requirements Engineering*, Recife, Brazil, February 25, 2016
- P40. Checking Data Practices against Privacy Policies**  
Travis D. Breaux, *U.S. Federal Trade Commission*, Washington, D.C., July 9, 2015
- P41. Governance and Compliance within the Limits of Technology (Keynote)**  
Travis D. Breaux, *Workshop on Principles and Practice of Privacy Science (3PS)*, College Park, MD, December 14-15, 2015
- P42. Hermeneutics of Information Privacy**  
Travis D. Breaux, *IFIP WG 2.9 on Requirements Engineering*, Cozumel, Mexico, February 18, 2015
- P43. Going Native - Relying on Pidgins and Creoles to Construct High Confidence Software (Keynote)**  
Travis D. Breaux, Keynote Speaker, *High Confidence Software and Systems Conference*, Annapolis, MD, May 6, 2014
- P44. Verifying Data Protection Rules in Complex Data Ecosystems (Keynote)**  
Travis D. Breaux, Keynote Speaker, *NSA/CSS Mission Compliance Conference*, Baltimore, May 7, 2014
- P45. Privacy Engineering: Examples of System Design Strategy (Keynote)**  
Travis D. Breaux, *NIST Privacy Engineering Workshop*, Gaithersburg, MD, April 9, 2014
- P46. Privacy Requirements Analysis in Distributed Systems**  
Travis D. Breaux, *IFIP WG 2.9 on Requirements Engineering*, Costa Rica, February 24, 2014
- P47. Modeling HIPAA and Health-related Privacy Statutes**  
Travis D. Breaux, *MIDAS Workshop on Engaging Computational Methods for Public Health Law & Policy*, October 7-8, 2013
- P48. Privacy Laws, Requirements and Policies**  
Travis D. Breaux, *Institute for Information Infrastructure Protection (I3P)*, Washington, D.C., June 6, 2012
- P49. Privacy and Security Requirements in the Cloud**  
Travis D. Breaux, *Secure Architectures in the Cloud*, *Dagstuhl*, Germany, Dec 5-8, 2011
- P50. Requirements Analysis for Multi-jurisdictional, Distributed Systems**  
Travis D. Breaux, *Hewlett-Packard Research Lab*, Bristol, UK, October 4, 2011
- P51. Toward Computational Policies for Regulatory Compliance**  
Travis D. Breaux, *Mission Rules Analysis Pod*, National Security Agency, February 23, 2011.
- P52. What should Software Developers Know about Developing Legally Compliant Software?**  
Travis D. Breaux, *University of Queensland*, Brisbane, Australia, October 6, 2010.
- P53. Exercising Due Diligence: Legal Requirements Acquisition and Formalization**  
Travis D. Breaux, *Institute for Defense Analyses*, Alexandria, Virginia, April 15<sup>th</sup> 2009.
- P54. Exercising Due Diligence: Legal Requirements Acquisition and Formalization**  
Travis D. Breaux, *Carnegie Mellon University*, Pittsburgh, Pennsylvania, May 26<sup>th</sup> 2009.
- P55. Aligning Information Systems with Policies and Laws**  
Travis D. Breaux, *Science and Technology Policy Institute*, Washington, DC, April 9<sup>th</sup> 2009.
- P56. Exercising Due Diligence: Legal Requirements Acquisition and Formalization**  
Travis D. Breaux, *RAND Corporation*, Arlington, Virginia, March 23<sup>rd</sup> 2009.
- P57. Requirements Acquisition for Legal Compliance**  
Travis D. Breaux, *University of Texas at San Antonio*, San Antonio, Texas, March 6<sup>th</sup> 2009.
- P58. Requirements Acquisition for Legal Compliance**  
Travis D. Breaux, *DePaul University*, Chicago, Illinois, March 2<sup>nd</sup> 2009.
- P59. Legal Requirements: Theory and Practice for Specifying Legally Compliant Information Systems**  
Travis D. Breaux, *University of Nebraska*, Lincoln, Nebraska, February 26<sup>th</sup> 2009.

- P60. Legal Requirements: A Research Perspective from Theory to Practice**  
Travis D. Breaux, *IFIP WG 2.9 on Requirements Engineering*, Salvador, Brazil, February 28<sup>th</sup> 2008.
- P61. Beliefs, Determinations and Agreements: Contextualizing Privacy in Practice**  
Travis D. Breaux, *Carolina Privacy Officials Network*, Raleigh, NC, January 29<sup>th</sup> 2008.
- P62. Ethics in Computer Science: Technologists and Value-free Technology**  
Travis D. Breaux, *Annual NCSU Computer Science Fall Seminar Series*, Raleigh, NC, December 8<sup>th</sup> 2006.
- P63. What do Organizational Security Policies Say about Security?**  
Travis D. Breaux, *IBM Thomas J. Watson Research Laboratory*, Hawthorne, New York, July 28<sup>th</sup> 2005.
- P64. Information Analysis Techniques using Upper Ontology Languages**  
Travis D. Breaux, *Oak Ridge National Laboratory*, Oak Ridge, Tennessee, August 6<sup>th</sup> 2003.

## University Service

---

Faculty Senate Executive Committee, Secretary, 2021-2025  
University Committee on Non-Tenure Appointments, 2019-2021  
Faculty Senate Executive Committee, At-large Member, 2016-2017  
Faculty Senate Member, 2015-2017  
SCS Space Committee, ISR Faculty Representative, 2015

## Invited Panels

---

Panelist, New Faculty Symposium, *IEEE International Requirements Engineering Conference*, Reykjavik, Iceland, June 25, 2024.

Panelist, "Data De-Identification as a Practical Risk Control," *IAPP Global Privacy Summit*, Washington, D.C., April 13, 2022

Panelist, "Protecting Our Elections from Domestic and Foreign Cyberattacks," *NCSA and Nasdaq Cybersecurity Summit*, New York, New York, October 16, 2018.

Panelist, "Securing America's Critical Infrastructure," *NCSA and Nasdaq Cybersecurity Summit*, New York, New York, October 16, 2018.

Panelist, "Accountable Machine Learning & AI," *Center for Information Policy and Leadership*, Washington, D.C., July 20, 2017.

Panelist, "Privacy: Protecting Trust and Promoting Transparency", *Highmark, Inc.*, Pittsburgh, PA, June 11, 2015

Panelist, "Overview of Privacy Engineering Approaches," NIST Privacy Engineering Workshop, Gaithersburg, MD, April 9, 2014

Panelist, "Overview of the Data Industry," *Attorneys General Education Program, Public Policy Conference on the Law & Economics of Privacy and Data Security*, George Mason University, Washington, D.C., June 20, 2013

Panelist, *International Privacy Day*, Carnegie Mellon University, Pittsburgh, PA January 28, 2013

Panelist, "Laws against adopting PETs (Privacy Enhancing Techniques)," *International Financial Cryptography*, Bonaire, Netherlands Antilles, February 29, 2012

Panelist, "Translating between Law and Technology," *15<sup>th</sup> Annual Berkeley Center for Law and Technology Symposium*, Berkeley, California, March 3, 2011

Panelist, "Shaping the Task of Law Making," *15<sup>th</sup> Annual Berkeley Center for Law and Technology Symposium*, Berkeley, California, March 3, 2011

Panelist, *International Privacy Day*, Carnegie Mellon University, Pittsburgh, PA January 26, 2011



## Invited Grant Proposal Reviewer

---

*Reviewer*, Natural Sciences and Engineering Research Council (NSERC) of Canada, 2010, 2020

*Panel Member*, U.S. National Science Foundation, 2013, 2014, 2017, 2021

*Interest Group Panel Member*, ENDORSE ICT, European Commission, FP7, 2012

*Reviewer*, Austrian Science Fund (FWF), 2012

*Reviewer*, Fonds de recherché Nature et technologies, Quebec, 2016.

*Reviewer*, Fonds National del la Recherche (FNR) Luxembourg, 2009, 2012- 2014

## Patents and Invention Disclosures

---

CMU Invention Disclosure 2014-056 entitled “Data Flow Tracing Within and Across Requirements Specifications,” October 21, 2013

CMU Invention Disclosure 2014-043 entitled “Conflict Detection in Data Requirements Specifications,” October 21, 2013

CMU Invention Disclosure 2013-010 entitled “Requirements Water Marking: A Method for Reconciling Multi-jurisdictional Regulatory Requirements,” July 25, 2012

CMU Invention Disclosure 2011-077 entitled “Requirements Specification Language for the Design and Debugging of Computational Policy Documents”, March 4, 2011

## Teaching and Course Development

---

|             |   |
|-------------|---|
| Fall 2024   | Requirements for Information Systems (17-627)   |
| Spring 2024 | Prompt Engineering (17-630)   |
| Fall 2023   | Requirements for Information Systems (17-627)   |
| Fall 2023   | Thesis Writing for Industrial Software Research (17-679)  |
| Summer 2023 | IEEE Digital Privacy: Designing Trustworthy Systems and Technologies <sup>1</sup>                       |
| Fall 2022   | Requirements for Information Systems (17-627)   |
| Spring 2022 | Applied Machine Learning (17-635)   |
| Fall 2021   | Applied Machine Learning (17-635)   |
| Fall 2020   | Requirements for Information Systems (17-627)   |
| Fall 2019   | Artificial Intelligence for Software Engineering (CMU 17-649, 17-749)                                   |
| Fall 2019   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Spring 2019 | Artificial Intelligence for Software Engineering (CMU 17-649)   |
| Fall 2016   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Fall 2015   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Spring 2016 | Engineering Privacy in Software (CMU 08-605)  |
| Fall 2015   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Spring 2015 | Engineering Privacy in Software (CMU 08-605)  |
| Fall 2014   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Fall 2014   | Current Topics in Privacy Seminar (CMU 08-602)  |
| Spring 2013 | Engineering Privacy in Software (CMU 08-605)  |
| Fall 2013   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Fall 2012   | Methods: Deciding What to Design, graduate course (CMU 17-652, 17-752)                                  |
| Fall 2012   | Foundations of Software Engineering, undergraduate course, co-taught with William Scherlis (CMU 15-313) |
| Fall 2012   | Software Engineering Research, undergraduate course, co-taught with ISR faculty (CMU 15-313)            |
| Spring 2012 | Privacy Policy, Law, and Technology (CMU 8-533, 8-733, 19-608, 95-818)                                  |
| Fall 2011   | Foundations of Software Engineering, undergraduate course, co-taught with William Scherlis (CMU 15-313) |

---

<sup>1</sup> <https://ieeexplore.ieee.org/courses/details/EDP677>

Fall 2011      Methods: Deciding What to Design, graduate course co-taught with Jim Herbsleb  
(CMU 17-652, 17-752)

## Academic Advising

---

Sarah Santos, Ph.D. in Software Engineering, started Fall 2023.

Yuchen Shen, Ph.D. in Software Engineering, started Fall 2020, expected graduation May 2025.

Morgan C. Evans, Ph.D. in Software Engineering, Fall 2017-2020.

Jaspreet Bhatia, Ph.D. in Software Engineering, started Fall 2014, graduated May 2019, Thesis Title: *Ambiguity in Privacy Policies and Perceived Privacy Risk*

Hanan Hibshi Ph.D. in Societal Computing, started Fall 2011, graduated August 2018, Thesis Title: *Composite Security Requirements in the Presence of Uncertainty*

Daniel Smullen, Ph.D. in Software Engineering, Fall 2014-2017

Sudharshan Wadkar, Masters in Software Engineering, Spring 2014-2018

Ashwini Rao, Ph.D. in Software Engineering, Fall 2012-2013

David Gordon, Ph.D. in Engineering and Public Policy, started Fall 2010, graduated June 2014, Thesis Title: *Without Borders: Addressing Legal Requirements in Multi-Jurisdictional IT Environments*

## Research Funding

---

Title: Collaborative Research: DASS: Legal Accountability as Software Quality  
PI: Travis Breaux, Co-PI: Thomas Norton, Fordham University  
Agency: National Science Foundation  
Duration: October 2022 – September 2025  
Amount: \$511,483

Title: SHF: Small: Privacy Impact and Risk Assessment at Design-Time  
PI: Travis Breaux  
Agency: National Science Foundation  
Duration: August 2020 – September 2023  
Amount: \$498,221

Title: Leveraging the Multi-Stakeholder Nature of Cyber Security  
PI: Christian Wagner, Co-PI: Travis Breaux  
Agency: UK Engineering and Physical Sciences Research Council  
Duration: January 2017 – December 2019  
Amount: £1,000,000 with sub-contract to CMU for \$179,625

Title: Information Assurance Decision Support and Automation  
PI: Travis D. Breaux  
Agency: Naval Postgraduate School  
Duration: August 2018 – July 2019  
Amount: \$120,000

Title: Architecture-driven Information Assurance for Rapid Acquisition  
PI: Travis D. Breaux  
Agency: Naval Postgraduate School  
Duration: January 2016 – December 2017  
Amount: \$120,000

Title: Real-time Privacy Risk Evaluation and Enforcement  
PI: Travis D. Breaux

Agency: National Security Agency  
Duration: March 2016 – February 2017  
Amount: \$139,811

Title: CAREER: Software Requirements Evolution in a Multi-Jurisdictional, Socio-Technical Ecosystem  
PI: Travis D. Breaux  
Agency: National Science Foundation  
Duration: September 2015 – August 2020  
Amount: \$600,000

Title: Tools to improve consistency between privacy policies and current practice  
PI: Travis D. Breaux, Co-PIs: Alberto Silva  
Agency: Government of Portugal  
Duration: December 2014 – November 2015  
Amount: \$17,000

Title: Improving Rapid Information Technology Acquisition in an Integrated, Risk-Managed Environment  
PI: Travis D. Breaux  
Agency: Naval Postgraduate School  
Grant No: Pending  
Duration: January 2014 – August 2015  
Amount: \$120,000

Title: Usable Formal Methods for the Design and Composition of Security and Privacy Policies  
PI: Travis D. Breaux; Co-PIs: Jianwei Niu  
Agency: National Security Agency  
Duration: April 2013 – February 2016  
Amount: \$240,000

Title: TWC SBE: Option: Frontier: Collaborative: Towards Effective Web Privacy Notice and Choice: A Multi-Disciplinary Prospective  
PI: Norman Sadeh; Co-PIs: Alessandro Acquisti, Travis Breaux, Lorrie Cranor, Noah Smith  
Agency: National Science Foundation  
Grant No: 1330596  
Duration: September 2013 – February 2017  
Amount: \$693,716

Title: Deconstructing Context and Comparative Analysis in Multi-National Privacy Policy  
PI: Travis D. Breaux; Co-PIs: Alessandro Acquisti, Rahul Telang  
Agency: Department of Homeland Security, under the Institute for Information Infrastructure Protection (I3P)  
Grant No: 2006-CS-001-000001  
Duration: February 2011 – July 2012  
Amount: \$175,000

Title: Harmonizing Privacy and Security Requirements Across Multiple Jurisdictions  
PI: Travis D. Breaux  
Agency: Hewlett-Packard Labs Innovation Research Program  
Award No: CW267287  
Duration: October 2011 – September 2013  
Amount: \$150,000

Title: Rapid Acquisition for Mobile Applications in a Risk-Managed Environment  
PI: Travis D. Breaux  
Agency: Naval Postgraduate School  
Duration: October 2011 – September 2012  
Amount: \$119,809

Title: Improving Usability of Security Requirements by Software Developers through Empirical Studies and Analysis  
PI: Travis D. Breaux; Co-PIs: Laurie Williams, Jianwei Niu  
Agency: National Security Agency  
Duration: December 2011 – September 2013  
Amount: \$260,000