Denis Ulybyshev

Research / Teaching Assistant, PhD Candidate
Department of Computer Science
CERIAS, Purdue University;
Cybersecurity Software Engineer, Coze Health LLC

Phone:
Email: dulybysh@purdue.edu
Homepage: https://www.cs.purdue.edu/~ dulybysh/
West Lafayette, Indiana, 47907

**Authorized to work in the U.S. with an OPT option after graduation (currently on F-1 Visa)*

EDUCATION

Ph.D. Computer Science — Purdue University, Cumulative/Major GPA: 3.62 / 3.78 — May, 2019
M.S. Automatic Control Systems — Bauman Moscow State Technical University (top-10 in Russia) — June, 2004
Cumulative GPA: 3.93 out of 4

SUMMARY

Knowledgeable innovator in Information Security, Databases and Distributed Systems. Published twelve academic peer-reviewed publications, including seven first-author publications. 8 years of industrial experience in developing large-scale software for mass market, including firmware for printers, software for healthcare industry and industrial control systems. Has received four research and teaching awards. Two years of research in NSF project and four years of research for a corporate sector in the United States. Made significant contributions to writing five funded research proposals. Have an experience in writing NSF, NIH and DARPA proposals. PhD Candidate in Computer Science at Purdue University, graduating in May, 2019. Ready to start full-time work in July, 2019.

ACADEMIC POSITIONS

1. Research Assistant (Department of Computer Science, Purdue University)

Project Title	Terms / Dates	Funded by	Project Description and Accomplishments
Situational Awareness and Targeted Information Propagation	Spring 2019	Bilsland Dissertation Fellowship from Purdue University	Aim to develop real-time machine learning-based object detection algorithms that can be used by autonomous vehicles. Solution will cover object detection from incomplete data sets and profiling of mission requirements. Profiling identifies the information needed by subjects, based on past behavior. Targeted information propagation algorithm pushes the relevant data to the relevant subject, based on machine learning algorithms. Data is protected at rest and in transit
Data Leakage Detection and Privacy-preserving Data Dissemination	Fall 2017 - Spring 2018	Corporate Partners of Purdue Univ. Computer Science Dept.: Northrop Grumman, Qualcomm, Intel, Raytheon, Eli Lilly, …	Designed and developed "Blockhub" framework for privacy-preserving data communications. The approach provides secure cross-domain software distribution and development. Blockchain-based technology is applied to ensure integrity of provenance data and to record every software access, transfer and update in a blockchain public ledger. Project resulted in three published peer-reviewed conference papers [1], [6], [7]. Prototype demo video [17] is available.
Secure V2X (Vehicle-to-Everything) Systems	Spring 2017	Qatar National Research Fund (a member of Qatar Foundation)	Designed and developed a mechanism for secure V2X (Vehicle-to-Everything) communications, enabling data protection at rest and in transit. Solution provides data confidentiality, integrity, role-based and attribute-based access control, as well as capabilities of building analytics over encrypted vehicle records. Experiments were conducted on a trade-off between vehicle's safety and cybersecurity. Project resulted in published peer-reviewed papers in reputable conferences [2], [4].

Project Title	Terms / Dates	Funded by	Project Description and Accomplishments
Secure / Resilient Systems and Data Dissemination / Provenance	Spring 2017	Northrop Grumman Cybersecurity Research Consortium	Designed and implemented "WAXEDPRUNE" (Web-based Access to Encrypted Data Processing in Untrusted Environments), with capabilities of detecting several types of data leakages, made by insiders. Protection is provided by the kernel of an Active Bundle [5], as well as by digital/ visual watermarks, embedded into data and verified by a web crawler. Furthermore, support of encrypted search over encrypted data is enabled. Demo video [16] is available. Project resulted in a published peer-reviewed paper in a reputable journal [3].
Privacy-Preserving Data Dissemination and Adaptable Service Compositions in Trusted & Untrusted Cloud	Spring 2016	Northrop Grumman Cybersecurity Research Consortium	Designed and implemented a framework for selective data dissemination based on roles and the following client's attributes: (a) security level of a web browser; (b) authentication method (password-based vs. hardware-based vs. fingerprint); (c) type of the network; (d) type of the device (mobile vs. desktop). Peer-reviewed paper [5] has been published in IEEE CLOUD 2017 conference. Prototype demo video [15] is available. The prototype was selected by Northrop Grumman and demonstrated at NGC Tech Expo 2016
End-to-End Security Policy-Auditing and Enforcement in Untrusted Cloud	Spring 2015	Northrop Grumman Cybersecurity Research Consortium	Developed a privacy-preserving data dissemination framework that supports role-based and attribute-based access control in Service-Oriented Architecture. Attributes include trust level of services that is constantly recalculated, and context (e.g. emergency vs. regular context). The project won best poster award [18] at 16-th CERIAS Security Symposium (#1 out of 43 posters). Peer-reviewed paper [9] has been published.
Robust Distributed Wind Power Engineering	Spring 2013 – Fall 2014	NSF	Designed and implemented a robust crack detection algorithm for wind turbine blades, using vibro-accoustic analysis. Peer-reviewed paper [12] has been published. Source code is available at [14]

2. Teaching Assistant (Computer Science Department, Purdue University)

Course Title	Terms/Dates	Course Description
Information Systems / Relational Databases	Fall 2018, Fall 2016, Fall 2015	Relational Models, ER-diagrams, SQL/PLSQL; Dependencies and Normal Forms; Concurrency Control; NoSQL Databases; Database Security; Hadoop, Spark; Information Retrieval
Data Structures and Algorithms	Summer 2018	Basic data structures (array, linked list, stack, queue, heap, hash table, tree, trie, dictionary) and algorithms, using C/C++
Distributed Databases	Spring 2015	Concurrency Control Algorithms, Commitment Protocols (PAXOS), Privacy Preservation and Identity Management in Distributed Systems
Cryptography	Fall 2012	Symmetric Encryption (DES, AES); Asymmetric Encryption (Diffie-Hellman, RSA, Elliptic Curves); Digital Signatures; Hash Functions; HMAC; PKI (Public Key Infrastructure); Kerberos

RESEARCH INTERESTS

1. Data privacy: secure data communications, role-based and attribute-based access control, data leakage detection.
2. Cloud security.
3. Language-based security.
4. Database security: encrypted search over encrypted data, access control
5. Distributed systems: blockchain-based technologies, concurrency control, commitment protocols.
6. Information Retrieval: web search, Search Engine Optimization.
7. Machine Learning: object detection, targeted information propagation
8. Vehicle-to-Vehicle Communication Systems.
9. Industrial Automation: Automatic Control Systems, IoT, SCADA systems, Programmable Logical Controllers.

INDUSTRIAL POSITIONS

- **Cybersecurity Software Engineer**
  Company: Coze Health, LLC **June, 2018 - Dec. 2018**
  Responsibilities:
  - Design and develop secure HIPAA-compliant solutions for video conferencing, message chat, fax and electronic surveys, using end-to-end encryption, two-factor authentication and firewalls
  - Develop cloud-based solutions for storing and processing encrypted Electronic Medical Records, using Amazon EC2 cloud infrastructure

- **Software Engineer (Intern)**
  Company: Flexware Innovations **May, 2017 - Aug. 2017**
  Responsibilities:
  - Design and develop meeting room calendar management system (based on Microsoft Outlook and Google calendars), integrated into cloud-based Automation System
  - Develop FMEA (Failure-Mode-Effect Analysis) project for battery management system (for 'A123 Systems' company)

- **Software Engineer**
  Company: Raduga LLC **July, 2009 - July, 2012**
  Responsibilities:
  - Design and develop automatic control systems for rolling mills
  - Web development for a corporate website and search-engine optimization
  - Context web-advertisement

- **Embedded Software Engineer**
  Company: Samsung Electronics **Apr, 2007 - Feb. 2009**
  Responsibilities:
  - Design and develop firmware (mass-storage component) for multifunction Peripherals (MFPs) and printers, including hard disk drivers
  - Design and develop an automated firmware testing tool (for mass-storage component)

- **Software Developer, Technical Marketing Engineer**
  Company: Schneider Electric **Sep, 2003 - Jan. 2007**
  Responsibilities:
  - Design and develop Energy Management Control Systems for compressor plants, gas-turbine power stations, high-voltage substations in integration with Siemens, OMRON hardware
  - Design and develop software for Building Management systems: CCTV, Heat-Ventilation-Air-Conditioning, access control

PUBLICATIONS (peer-reviewed)

1. D. Ulybyshev, M. Villarreal, B. Bhargava, G. Mani, S. Seaberg, P. Conoval, R. Pike, J. Kobes "Blockhub: Blockchain-based Software Development System for Untrusted Environments", IEEE CLOUD, San-Francisco, July 2018
2. D. Ulybyshev, A. Alsalem, B. Bhargava, S. Savvides, G. Mani, L. Ben-Othmane, "Secure Data Communication in Autonomous V2X Systems", IEEE ICIOT, San-Francisco, July 2018
3. D. Ulybyshev, B. Bhargava, A. Alsalem, "Secure Data Exchange and Data Leakage Detection in Untrusted Cloud", Springer Journal on 1-st Intl Conf. on Applications of Computing and Communication Technologies (ICACCT), 2018, pp. 99-113
4. D. Ulybyshev, S. Palacios, G. Mani, A. Alsalem, B. Bhargava, P. Goyal, "On-the-fly Analytics over Encrypted Records in Untrusted V2X Environments", ICACEEE 4-th Intl. Conf, Zurich, Switzerland, May 2018
5. D. Ulybyshev, B. Bhargava, M. Villarreal, D. Steiner, L. Li, J. Kobes, H. Halpin, R. Ranchal, A. Alsalem, "Privacy-preserving Data Dissemination in Untrusted Cloud", IEEE CLOUD 10th Intl. Conf., Honolulu, 2017, pp. 770-773

6. G. Mani, D. Ulybyshev, B. Bhargava, J. Kobes, P. Goyal, "Autonomous Aggregate Data Analytics in Untrusted Cloud", IEEE AIKE, Laguna Beach, Sep. 2018
7. G. Mani, B. Bhargava, P. Angin, M. Villarreal-Vasquez, D. Ulybyshev, J. Kobes, "Machine Learning Models to Enhance the Science of Cognitive Autonomy", IEEE AIKE, Laguna Beach, Sep. 2018
8. S. Sardesai, D. Ulybyshev, L. Ben-Othmane, B. Bhargava, "Impacts of Security Attacks on The Effectiveness of Collaborative Adaptive Cruise Control Mechanism", Intl. Conf. on Smart Cities-2, Kansas City, Sep. 2018
9. C. Qu, D. Ulybyshev, B. Bhargava, R. Rohit, and L. Lilien, "Secure Dissemination of Video Data in Vehicle-to-Vehicle Systems", 6th Intl. Workshop on Dependable Network Computing and Mobile Systems (DNCMS2015), Montreal, Canada, Sep. 2015
10. D. Ulybyshev. "Comparison of fuzzy and regular Least-Squares Methods in the random noise filtering task", Trans. of 5-th Intl. Symp. "Intelligent control systems 2002". – Caluga (2002), Russia, ISBN 5 – 7038 – 2049 – 9, pp. 320-323
11. D. Ulybyshev. "Fuzzy Least-Squares Method and its modifications for different kinds of fuzzy "AND" operation in the random noise filtering task", Trans. of Intl. Symp. "Reliability and Quality". – Penza (2003), Russia, ISBN 5 – 94170 – 031 – 8, pp. 203-207
12. N. Myrent, D.Adams, G.Rodriguez-Rivera, D. Ulybyshev, J.Vitek, E.Blanton, T. Kalibera, "A Robust Algorithm to Detecting Wind Turbine Blade Health Using Vibro-Acoustic Modulation and Sideband Spectral Analysis", 33rd ASME Wind Energy Symp., 2014

THESIS

13. D. Ulybyshev, "Energy Management Control System for high-voltage substations". M.S. Thesis, Bauman Moscow State Technical University, Department of Automatic Control Systems, 2004.

DEMO VIDEOS & CODE REPOSITORIES

14. Crack detection application for wind turbine blades
    https://github.com/Denis-Ulybysh/CrackDetection_ComparingBlades, accessed: Dec.2018
15. WAXEDPRUNE: privacy-preserving attribute-based data communications prototype demo video
    https://www.dropbox.com/s/30scw1srqsmyq6d/BhargavaTeam_DemoVideo_Spring16.wmv?dl=0 , accessed: Dec.2018
16. WAXEDPRUNE: data leakage detection and encrypted search over encrypted data prototype demo video
    https://www.dropbox.com/s/oxgy7xsovcrkel9/NGCRC-2017-WaxedPrune-Demo.wmv?dl=0 , accessed: Dec.2018
17. Blockchain-based privacy-preserving data communication in Intelligent Autonomous Systems
    https://www.dropbox.com/s/x3l8w9l49am2cnw/Demo_NGCRC_Bhargava_Compiled.mp4?dl=0 , accessed: Dec.2018

PRESENTATIONS AT CONFERENCES, SYMPOSIA AND WORKSHOPS

18. R. Ranchal, D. Ulybyshev, P. Angin and B. Bhargava. "PD3: Policy-based Distributed Data Dissemination", 16th CERIAS Security Symp., Mar. 2015. (best poster award, 1 out of 43)
    https://www.cerias.purdue.edu/assets/symposium/2015-posters/A61-FBE.pdf
19. D. Ulybyshev, B. Bhargava, M. Villarreal-Vasquez, A. Alsalem, D. Steiner, L. Li, J. Kobes, H. Halpin, R. Ranchal, L. Lilien, "Blockhub: Blockchain-based Secure Cross-domain Software Development and Sharing System", Purdue University Computer Science Lawson Poster Showcase, Sep. 2017
    https://www.cs.purdue.edu/homes/dulybysh/Papers/DenisUlybyshev_Poster-20171111-0336-Rel.pdf
20. D. Ulybyshev, B. Bhargava, L. Li, J. Kobes, D. Steiner, H. Halpin, B. An, M. Villarreal, R. Ranchal, "Privacy-Preserving Data Dissemination and Data Leakage Detection in Untrusted Cloud". Global Security and Defense Innovation Symposium, Dec. 2016
21. "Secure / Resilient Systems and Data Dissemination / Provenance", NGC Research Consortium Symposium at Purdue University, Nov. 2017
22. D. Ulybyshev, B. Bhargava, L. Li, J. Kobes, D. Steiner, H. Halpin, B. An, M. Villarreal, R. Ranchal, "Authentication of User's Device and Browser for Data Access in Untrusted Cloud", 17th CERIAS Security Symposium, Apr. 2016 https://www.cerias.purdue.edu/symposium/index.php/posters/year/2016/998-DCA
23. D. Ulybyshev, B. Bhargava, C. Qu, R. Ranchal, L. Lilien, "Secure data dissemination in Vehicle-to-Vehicle Systems", 17th CERIAS Security Symposium, Apr. 2016
    https://www.cerias.purdue.edu/assets/symposium/2016-posters/14B-A99.pdf
24. "Privacy-preserving Data Dissemination and Adaptable Service Compositions in Trusted and Untrusted Cloud", NGC Research Consortium Symposium, Apr. 2016

AWARDS AND FELLOWSHIPS

1. ***Bilsland Dissertation Award Fellowship*** (research funds for Spring, 2019) **Aug. 2018**
2. ***Purdue Computer Science Corporate Partners Award*** (research funds for 2017-2018 Academic year) **Apr. 2017**
   Pool of corporate partners, including Northrop Grumman, Qualcomm, Intel, Raytheon, Eli Lilly,
   ranked research proposal as #1 out of 21
3. ***Purdue Computer Science Harris Teaching Award*** for "Supporting Women in Computer Science" **Apr. 2017**
4. ***Best Poster Award*** at 16-th CERIAS Security Symposium **Mar. 2015**
   (selected as #1 out of 43 by Corporate Partners of Computer Science Department, Purdue University)
   Poster: "PD3: Policy-based Distributed Data Dissemination"
   Winner's certificate: https://www.cs.purdue.edu/homes/dulybysh/Images/CeriasCertificate-dulybysh.jpg
5. ***Echelon LonWorks DEVICE Certified Developer*** #200525 (in Building Management Systems) **Aug. 2005**

ACADEMIC ADVISOR

- Prof. Suresh Jagannathan **Aug.2012 – Dec. 2014**
- Prof. Bharat Bhargava **Jan.2015 – present**

LANGUAGES

- English (Good), Russian (Fluent), German (basic), Korean (basic)

PROFESSIONAL MEMBERSHIPS

- Member of Information Systems Security Association (ISSA), Indiana Chapter, **Jan.2018 – present**

UNIVERSITY SERVICE

- PhD Representative, Web-master in Computer Science Graduate Student Board
  at Purdue University **2012 – 2017**

LinkedIn: https://www.linkedin.com/in/denisulybyshev/ **GitHub: https://github.com/Denis-Ulybysh**