Miguel Vargas Martin, PhD, PEng

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Employment History

2017 – · · · · **Professor,** Ontario Tech University.
2009 – 2017 **Associate Professor,** Ontario Tech University.
2004 – 2009 **Assistant Professor,** Ontario Tech University.
2003 – 2004 **Post-Doctoral Fellow,** Carleton University/Alcatel Canada.
2002 **Instructor,** Carleton University.

Education

1999 – 2003 **Ph.D., Carleton University**. Computer Science.
Thesis title: *Enhancing Hyperlink Structure for Improving Web Performance.*

1996 – 1998 **M.Sc., Cinvestav del IPN**. Electrical Engineering.
Thesis title: *Bridge Algorithms.*

1991 – 1996 **B.Sc., Universidad Autónoma de Aguascalientes**. Computer Science.

Tri-Council Grants as Sole/Principal Investigator

2024–2026 Enhancing Authentication: Increasing Resiliency against Targeted Password Attacks and Preventing Misuse of Cryptographic Libraries for Authentication. **Discovery Development Grants**, $40,000.

2018–2024 Enhancing Authentication: Towards Password Memorability Meters, and Leveraging Implicit Learning for System-Assigned Passwords. **NSERC Discovery Grants Program - Individual**, $140,000.

2013–2018 Towards New Security Paradigms for User Authentication and Traffic Inspection: Harnessing Implicit Mistakes and Auditory Sense. **NSERC Discovery Grants Program - Individual**, $75,000.

2009–2012 Towards Self-Adaptive Internet-Delivered Health Sciences Education. **SSHRC Standard Research Grants**, $35,000.

2008–2013 Network Security with Automatic Mitigation of Disruptive Traffic, Attack Containment, and Intrusion Detection. **NSERC Discovery Grants Program - Individual**, $75,000.

2007 Laboratory for Network Security with Automatic Mitigation of Disruptive Traffic, Attack containment, and Intrusion Detection. **NSERC Research Tools and Instruments - Category 1 (<$150,000)**, $17,676.

2005–2008 Network Infrastructure Security Through Prevention, Detection, Reaction, and Mitigation of Malicious Software Attacks. **NSERC Discovery Grants Program - Individual**, $36,000.

Courses

Graduate

2023–···· **AI Programming**, Ontario Tech University.

2018–···· **Machine Learning**, Ontario Tech University.

2006–···· **Cryptography**, Ontario Tech University.

Undergraduate

2018–···· **Machine Learning**, Ontario Tech University.

2006–2021 **Cryptography**, Ontario Tech University.

2004–2017 **Mobile Web Programming; Malware; Computer Security; Discrete Mathematics; Java; C++; Python**, Ontario Tech University.

2002 **C++**, Carleton University.

Presentations

Keynote Talks

2021 **Artificial Intelligence as an Enabler of Inclusive Technologies and Education**, International Conference of Inclusive Technology and Education, La Paz, Mexico.

2014 **Studying Students' Development of Misconceptions in Hybrid and Online Courses**, IEEE BigData, Autonomous Technology Institute of Mexico (ITAM), Mexico City, Mexico.

2012 **Education and Technology in the XXI Century**, Inauguration of PhD in Computer Science Program, Institute of Technology of Aguascalientes, Mexico.

2008 **Computer and Network Security, and Other Disparates**, Exact Sciences Symposium, University of Aguascalientes, Mexico.

Combating Child Exploitation in the Internet, Annual POLCYB International Summit, Bangkok, Thailand.

Invited Talks

2022 **Honeywords: Detecting Password Breaches Faster**, Universidad Autónoma de Baja California Sur, La Paz, Mexico.

Honeywords: Detecting Password Breaches Faster, University of Chihuahua, Ciudad Juárez, Mexico.

2021 **Password Systems - Improve or Replace Them Altogether?**, University of Chihuahua, Ciudad Juárez, Mexico.

2019 **Relationship Between Personality and Password Creation and Selection**, Politecnico di Torino, Italy.

2017 **Detecting Subconscious Face Recognition Using Consumer-Grade Brain-Computer Interfaces**, Cinvestav del IPN, Guadalajara, Mexico.

2016 **Do Brain-Computer Interfaces Have a Future in Learning Environments?**, Military University of Bogota, Colombia.

2015 **Hamming Distance as a Metric for the Detection of CRC-Based-Side-Channel Communications in 802.11 Wireless Networks**. University of Windsor, Canada.

Exploring New Cyber Security Paradigms, University of Texas at El Paso, United States.

2008 **Combating Internet Child Exploitation**, International Workshop on Software as a Service, Tsinghua University, China.

Research Publications (last 6 years)

Journal Articles (last 6 years)

1. Nimmagadda, R., Arora, K., & **Vargas Martin**, **M.** (2022). Emotion recognition models for companion robots. *The Journal of Supercomputing*, 1–18. doi:https://doi.org/10.1007/s11227-022-04416-4
2. Joudaki, Z., Thorpe, J., & **Vargas Martin**, **M.** (2019). Enhanced tacit secrets: System-assigned passwords you can't write down, but don't need to. *International Journal of Information Security*, *18*, 1–17. doi:10.1007/s10207-018-0408-2
3. Alomari, R., **Vargas Martin**, **M.**, MacDonald, S., Maraj, A., Liscano, R., & Bellman, C. (2019). Inside out - a study of users' perceptions of password memorability and recall. *Journal of Information Security and Applications*, *47*, 223–234. doi:https://doi.org/10.1016/j.jisa.2019.05.009

Conference Proceedings (last 6 years)

1. Mithila, M., Yu, F., **Vargas Martin**, **M.**, & Wang, S. (2024). Visualizing differential privacy: Assessing infographics' impact on layperson data-sharing decisions and comprehension. In *Conference on privacy, security, and trust (PST)*, Sydney, Australia: IEEE.
2. Maraj, A., **Vargas Martin**, **M.**, & Makrehchi, M. (2024). Coherence graphs: Bridging the gap in text segmentation with unsupervised learning. In *Conference on natural language & information systems (NLDB)*, Turin, Italy: Springer.
3. Lingutla, S., Nety, M., & Vargas Martin, M. (2023). Beyond chunking: Re-engineering password segmentation for better honeywords. In *Conference in software engineering research and innovation (CONISOFT)*, León, Mexico: IEEE.
4. Vydelingum, M., & **Vargas Martin**, **M.** (2023). How password strength becomes a weak link for honeywords. In *Conference in software engineering research and innovation (CONISOFT)*, León, Mexico: IEEE.
5. Yu, F., & **Vargas Martin**, **M.** (2023). Honey, I chunked the passwords: Generating semantic honeywords resistant to targeted attacks using pre-trained language models. In *Conference on detection of intrusions and malware & vulnerability assessment (DIMVA)*, Hamburg, Germany: Springer.
6. Yu, F., & **Vargas Martin**, **M.** (2022a). HoneyGAN: Creating indistinguishable honeywords with improved generative adversarial networks. In *European symposium on research in computer security (ESORICS) 2022 workshop*. doi:10.1007/978-3-031-29504-1_11
7. Yu, F., & **Vargas Martin**, **M.** (2022b). GNPassGAN: Improved generative adversarial networks for trawling offline password guessing. In *2022 IEEE European symposium on security and privacy workshops (EuroS&PW)* (pp. 10–18). doi:10.1109/EuroSPW55150.2022.00009
8. Dubey, R., & **Vargas Martin**, **M.** (2021). Fool me once: A study of password selection evolution over the past decade. In *2021 18th international conference on privacy, security and trust (PST)* (pp. 1–7). doi:10.1109/PST52912.2021.9647823
9. Jagadeesh, N., & **Vargas Martin**, **M.** (2021). Alice in Passphraseland: Assessing the memorability of familiar vocabularies for system-assigned passphrases. In *Arxiv* (Vol. abs/2112.03359). Not refereed. arXiv: 2112.03359. Retrieved from https://arxiv.org/abs/2112.03359
10. Maraj, A., **Vargas Martin**, **M.**, & Makrehchi, M. (2021). A more effective sentence-wise text segmentation approach using BERT. In J. Lladós, D. Lopresti, & S. Uchida (Eds.), *Document analysis and recognition (ICDAR) 2021* (pp. 236–250). doi:10.1007/978-3-030-86337-1_16
11. Wang, G., & **Vargas Martin**, **M.** (2021). SegmentPerturb: Effective black-box hidden voice attack on commercial ASR systems via selective deletion. In *2021 18th international conference on privacy, security and trust (PST)* (pp. 1–12). doi:10.1109/PST52912.2021.9647775

12. **Vargas Martin**, **M.**, Pérez Valle, E., & Horsburgh, S. (2020). Artificial empathy for clinical companion robots with privacy-by-design. In *International conference on wireless mobile communication and healthcare* (pp. 351–361). Springer.

13. Alomari, R., **Vargas Martin**, **M.**, MacDonald, S., & Bellman, C. (2019). Using EEG to predict and analyze password memorability. In *2019 IEEE international conference on cognitive computing (ICCC)* (pp. 42–49). doi:10.1109/ICCC.2019.00019

14. Maraj, A., **Vargas Martin**, **M.**, Shane, M., & Mannan, M. (2019). On the null relationship between personality types and passwords. In *2019 17th international conference on privacy, security and trust (PST)* (pp. 1–7). doi:10.1109/PST47121.2019.8949024

15. Wang, G., **Vargas Martin**, **M.**, Hung, P., & MacDonald, S. (2019). Towards classifying motor imagery using a consumer-grade brain-computer interface. In *2019 IEEE international conference on cognitive computing (ICCC)* (pp. 67–69). doi:10.1109/ICCC.2019.00023

16. Alomari, R., & **Vargas Martin**, **M.** (2018). Classification of EEG signals using neural networks to predict password memorability. In *2018 17th IEEE international conference on machine learning and applications (ICMLA)* (pp. 791–796). doi:10.1109/ICMLA.2018.00126

17. Bellman, C., **Vargas Martin**, **M.**, & MacDonald, S. (2018). (WKSP) On the potential of data extraction by detecting unaware facial recognition with brain-computer interfaces. In *2018 IEEE international conference on cognitive computing (ICCC)* (pp. 99–105). doi:10.1109/ICCC.2018.00022

18. Ibrahim, A., Rahnamayan, S., **Vargas Martin**, **M.**, & Deb, K. (2018). Enhanced correlation matrix based visualization for multi- and many-objective optimization. In *2018 IEEE symposium series on computational intelligence (SSCI)* (pp. 2345–2352). doi:10.1109/SSCI.2018.8628739

19. Joudaki, Z., Thorpe, J., & **Vargas Martin**, **M.** (2018). Reinforcing system-assigned passphrases through implicit learning. In *Proceedings of the 2018 ACM SIGSAC conference on computer and communications security* (pp. 1533–1548). doi:10.1145/3243734.3243764

20. Zhao, D., MacDonald, S., Gaudi, T., Uribe-Quevedo, A., **Vargas Martin**, **M.**, & Kapralos, B. (2018). Facial expression detection employing a brain computer interface. In *2018 9th international conference on information, intelligence, systems and applications (IISA)* (pp. 1–2). doi:10.1109/IISA.2018.8633661

Books and Chapters (last 6 years)

1. **Vargas Martin**, **M.**, & Hung, P. C. (2022). Privacy-preserving speech recognition. In D. Phung, G. I. Webb, & C. Sammut (Eds.), *Encyclopedia of machine learning and data science* (pp. 1–6). doi:10.1007/978-1-4899-7502-7_984-1

2. Velasquez Ortiz, R. A., Álvarez Rodriguez, F. J., **Vargas Martin**, **M.**, & Ponce Gallegos, J. C. (2020). Mapping of the transportation system of the city of Aguascalientes using GTFS data for the generation of intelligent transportation based on the smart cities paradigm. (pp. 177–185). doi:10.1007/978-3-030-32022-5_17

3. **Vargas Martin**, **M.** (2020). *Freedom and Reform: A novel based on the French Invasion and the Mexican Revolution (in Spanish: Libertad y Reforma: Novela basada en hechos de la Invasión Francesa y la Revolución Mexicana)*. Independently published. Retrieved from https://www.amazon.ca/dp/B0891N6D5V

Interview (last 6 years)

1. **Vargas Martin**, **M.** (2019). Students using AI to teach robot how to recognize human emotions. CTV News, Live Nationwide Interview with Merella Fernandez.

Students

PhD Theses

1. Mithila, M. (2024– · · · ·). Cybersecurity (in progress). Ontario Tech University.
2. Adjei, H. (2023– · · · ·). Cybersecurity (in progress). Ontario Tech University.
3. Agaga, S. (2023– · · · ·). Cybersecurity (in progress). Ontario Tech University. Co-supervised.
4. Reyes Acosta, R. E. (2023– · · · ·). Cybersecurity (in progress). Instituto Tecnológico de Aguascalientes (Mexico). Co-supervised.
5. Maraj, A. (2018– · · · ·). Natural language processing (in progress). Ontario Tech University. Co-supervised.
6. Alomari, R. (2014–2018). A study of password recall, perceived memorability, and strength using BCIs. Ontario Tech University.
7. Calvillo Moreno, E. A. (2014–2018). Classification and search algorithm based on CRISP-DM. University of Aguascalientes. Co-supervised.
8. Joudaki, Z. (2012–2017). Towards implicit learning of system-assigned authentication tokens. Ontario Tech University. Co-supervised.
9. Luna, H. (2012–2016). New design guidelines for groupware applications. Aguascalientes Institute of Technology. Co-supervised.
10. Ibrahim, A. (2011–2017). Toward enhancement of evolutionary multi- and many-objective optimization: Algorithms, performance metrics, and visualization techniques. Ontario Tech University. Co-supervised.
11. Mendoza González, R. (2006–2009). Usability specification models for online interactive systems security. University of Aguascalientes. Co-supervised.

Master's Theses

1. Yu, F. (2021–2022). Raising the bar for password crackers: Improving the quality of honeywords with deep neural networks. Ontario Tech University.
2. Tsiliopoulos, T. (2020– · · · ·). Authentication (in progress). Ontario Tech University. Co-supervised.
3. Jagadeesh, N. (2019–2021). Assessing the memorability of familiar vocabulary for system-assigned passphrases. Ontario Tech University.
4. Wang, G. (2019–2021). SegmentPerturb: Effective black-box hidden voice attack on commercial ASR systems via selective deletion. Ontario Tech University.
5. Rodríguez, E. (2018–2020). EEG signal analysis in search for learning patterns in blind and non-blind people. University of Aguascalientes. Co-supervised.
6. Velasquez, R. (2018–2020). Design of an architecture for the implementation of smart city transportation using cloud computing. University of Aguascalientes. Co-supervised.
7. Maraj, A. (2016–2018). What your personality says about your password. Ontario Tech University.
8. Bellman, C. (2015–2017). Using consumer-grade BCIs to detect traits of the human mind related to unaware face recognition. Ontario Tech University.
9. Luna Preciado, M. (2015–2016). Models to retrieve open source educational resources using a layer-based service-oriented architecture. University of Aguascalientes. Co-supervised.
10. McCormick, Á. (2014–2017). Evaluating Intel's hardware security development life cycle. Cinvestav del IPN. Co-supervised.

11. Chea, V. (2013–2015). Hamming distance as a metric for the detection of side channel in 802.11 wireless communications. Ontario Tech University.
12. Moore, B. (2013–2015). Detection of side-channel communication in a mobile ad-hoc network environment using the Hamming distance metric. Ontario Tech University. Co-supervised.
13. Veloz Vidal, C. (2013–2015). Models for developing native android apps based on best practices. University of Aguascalientes. Co-supervised.
14. Mohammed, O. (2012–2015). Spectrum sensing based on Capon power spectral density estimation. Ontario Tech University. Co-supervised.
15. Fernández Espinosa, A. (2010–2012). Cluster techniques and prediction models for a digital media learning environment. Ontario Tech University.
16. Regts, M. (2010–2012). A study of undergraduate health science students' perceptions, navigational choices, and learning outcomes with IPSims simulative learning environment. Ontario Tech University.
17. Rodríguez García, R. (2010–2013). Design and implementation of the Crypto-Assistant: An Eclipse plugin for usable password-based column level encryption based on hibernate and Jasypt. Ontario Tech University. Co-supervised.
18. Ibarra Hernández, U. (2009–2010). Software engineering requirements and security compliance for MoProSoft. University of Aguascalientes. Co-supervised.
19. Najafizadeh, A. (2009–2011). Detection of covert communications based on intentionally corrupted frame check sequences. Ontario Tech University. Co-supervised.
20. Ibrahim, A. (2007–2009). Detecting and preventing the electronic transmission of illicit images. Ontario Tech University.
21. Martínez, L. (2005–2006). A comparative study of models for life-cycle processes of software intensive systems. University of Aguascalientes. Co-supervised.

Master's Projects

1. Lingutla, S. (2023). Topic: AI-assisted cybersecurity (in progress). Ontario Tech University.
2. Mithila, M. (2023). Assessing infographics' influence on layperson data-sharing in differential privacy. Ontario Tech University.
3. Vydelingum, M. (2022–2023). Topic: AI-assisted cybersecurity (in progress). Ontario Tech University.
4. Dubey, R. (2021). None the wiser: A study of password selection evolution. Ontario Tech University.
5. Gudi, N. (2021). Analyzing patient's health by berg balance scale. Ontario Tech University.
6. Kalahasthi, C. K. (2021). Analysis of Berg balance scale for fall detection. Ontario Tech University.
7. Kumar, N. (2021). Designing a human body movement tracking application through BIO-SENSOR using SAS. Ontario Tech University.
8. Dong, Y. (2020). A comparison of password characteristics between RockYou and other password leaks. Ontario Tech University.
9. Sindu, A. P. (2019). Snips kids: Privacy by design smart assistant for kids. Ontario Tech University.
10. Rafferty, W. (2017). Intrusion detection system rules. Ontario Tech University.
11. Andu, O. (2014). Vulnerabilities and illegal uses of Bitcoin. Ontario Tech University.
12. Kaur, K. (2014). Security implications of brain-computer interfaces. Ontario Tech University.

13. Ewansiha, D. (2012–2013). Crypto-Assistant 2.0: An interactive tool for assisted data encryption. Ontario Tech University. Co-supervised.
14. Madtha, N. (2012–2013). Detection of side channel communication in MANETs using 802.11 Request to Send/Clear to Send (RTS/CTS) messages. Ontario Tech University. Co-supervised.
15. Vaughan, G. (2012). PAWS protocol draft security analysis for TV white space database. Ontario Tech University. Co-supervised.
16. Chadha, K. (2009). A Linux-based mitigation system against ping-flood attacks. Ontario Tech University.
17. Odor, M. (2009). Implementation of a frame handler module for MANETs. Ontario Tech University. Co-supervised.
18. Mir, Z. (2008). Computer forensics - techniques, tools, and applications. Ontario Tech University.
19. Nasri, B. (2008). Side channel wireless networks based on CRC modification. Ontario Tech University. Co-supervised.
20. Qi, L. (2007). Mitigation of fast propagating malicious attacks. Ontario Tech University.
21. Shupo, A. (2007). Packet classification using pattern recognition. Ontario Tech University.
22. Zandi, M. (2007). Security issues of internet telephony. Ontario Tech University.