

Curriculum Vitae

John V. Monaco

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Research Interests

- Statistical modeling of user and device behavior.
- Security and privacy in human-computer interaction.
- Neuromorphic computing and computational hardness.

Education

2013-2015 **Ph.D., Computer Science.**

Pace University, Pleasantville, NY.

Thesis: Time Intervals as a Behavioral Biometric.

Advisors: Dr. Charles C. Tappert, Dr. Lixin Tao, and Dr. Meikang Qiu.

2012-2013 **M.S., Computer Science.**

Pace University, Pleasantville, NY.

2008-2012 **B.S., Computer Science and B.S., Mathematics.**

Pace University, Pleasantville, NY.

Graduated *Summa Cum Laude*.

Professional Experience

2016–now **Computer Scientist.**

U.S. Army Research Laboratory, Aberdeen, MD.

2014–now **Adjunct Professor.**

Pace University, Pleasantville, NY.

2016–2016 **Postdoctoral Fellow.**

U.S. Army Research Laboratory, Aberdeen, MD.

Mentor: Dr. Manuel M. Vindiola; funded through ORISE.

2010–2014 **Research Assistant.**

Pace University, Pleasantville, NY.

Mentor: Dr. Charles C. Tappert; research funded through several Verizon Thinkfinity grants; teaching assistant for graduate-level courses.

2010–2011 **Teaching Assistant.**

Pace University, Pleasantville, NY.

Mentor: Dr. Jonathan Hill; teaching assistant for web development courses.

2009–2010 **Tutor.**

Pace University, Pleasantville, NY.

Computer science and mathematics tutor for undergraduate students.

Publications

Conference Proceedings

S&P'18 **John V. Monaco.** SoK: Keylogging Side Channels. In *Proc. 39th IEEE Symposium on Security and Privacy*. IEEE, 2018. (11.48% AR).

UEMCON'17 Md Liakat Ali, **John V. Monaco**, Charles C. Tappert. Keystroke Biometric studies with Hidden Markov Model and Its Extension on Short Fixed-Text Input. In *Proc. 8th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference*. IEEE, 2017. (**Best Paper Award**).

ISCAS'17 **John V. Monaco**, Manuel M. Vindiola. Integer Factorization with a Neuromorphic Sieve. In *Proc. 50th IEEE International Symposium on Circuits and Systems*. IEEE, 2017. (**Best Paper Award**, 45.7% AR).

ISCAS'17 Bryan P. Dawson, Jamie K. Infantolino, Manuel M. Vindiola, **John V. Monaco**. Tightly Integrated Deep Learning and Symbolic Programming on a Single Neuromorphic Chip. In *Proc. 50th IEEE International Symposium on Circuits and Systems*. IEEE, 2017. (45.7% AR).

BTAS'16 **John V. Monaco**, Manuel M. Vindiola. Crossing Domains with the Inductive Transfer Encoder: Case Study in Keystroke Biometrics. In *Proc. 8th IEEE International Conference on Biometrics: Theory, Applications and Systems*. IEEE, 2016. (42% AR).

BTAS'16 Aythami Morales, Julian Fierrez, Marta Gomez-Barrero, Javier Ortega-Garcia, Roberto Daza, **John V. Monaco**, Jugurta Montalvão, Jânio Canuto, Anjith George. KBOC: Keystroke Biometrics OnGoing Competition. In *Proc. 8th*

- IEEE International Conference on Biometrics: Theory, Applications and Systems*. IEEE, 2016. (42% AR).
- BTAS'16 Michael J. Coakley, **John V. Monaco**, Charles C. Tappert. Keystroke Biometric Studies with Short Numeric Input on Smartphones. In *Proc. 8th IEEE International Conference on Biometrics: Theory, Applications and Systems*. IEEE, 2016. (42% AR).
- ICB'16 **John V. Monaco**, Charles C. Tappert. Obfuscating keystroke time intervals to avoid identification and impersonation. In *Proc. 9th IAPR International Conference on Biometrics*. IAPR, 2016. (34% AR).
- EDSIGCON'15 Charles C. Tappert, Andreea Cotoranu, **John V. Monaco**. A real-world-projects capstone course in computing: A 15-year experience. In *Proc. ED-SIG Conference on Information Systems and Computing Education*. ISCAP, 2015.
- BigDataSecurity'15 Md Liakat Ali, Charles C. Tappert, Meikang Qiu, **John V. Monaco**. Authentication and identification methods used in keystroke biometric systems. In *Proc. 2nd IEEE International Symposium on Big Data Security on Cloud*. IEEE, 2015.
- BTAS'15 **John V. Monaco**, Charles C. Tappert, Md Liakat Ali. Spoofing key-press latencies with a generative keystroke dynamics model. In *Proc. 7th IEEE International Conference on Biometrics: Theory, Applications and Systems*. IEEE, 2015. (45% AR).
- ICB'15 **John V. Monaco**, Gonzalo Perez, Charles C. Tappert, Patrick Bours, Soumik Mondal, Sudalai Rajkumar, Aythami Morales, Julian Fierrez, Javier Ortega-Garcia. One-handed keystroke biometric identification competition. In *Proc. 8th IAPR International Conference on Biometrics*. IAPR, 2015. (45% AR).
- DSS'15 **John V. Monaco**. Identifying bitcoin users by transaction behavior. In *Proc. Defense, Security, and Sensing: Biometric and Surveillance Technology for Human and Activity Identification XII*. SPIE, 2015.
- IJCB'14 **John V. Monaco**. Classification and authentication of one-dimensional behavioral biometrics. In *Proc. International Joint Conference on Biometrics*. IEEE, IAPR, 2014. (31% AR).
- ICEBE'14 Jenny S. Li, **John V. Monaco**, Li-Chiou Chen, Charles C. Tappert. Authorship authentication using short messages from social networking sites. In *Proc. 11th IEEE International Conference on e-Business Engineering*. IEEE, 2014.
- IWBF'14 Steve Kim, Sung-Hyuk Cha, **John V. Monaco**, Charles C. Tappert. A correlation method for handling infrequent data in keystroke biometric systems.

- In *Proc. 2nd International Workshop on Biometrics and Forensics*. IEEE, 2014.
- EISIC'13 **John V. Monaco**, Ned Bakelman, Sung-Hyuk Cha, Charles C. Tappert. Recent advances in the development of a long-text-input keystroke biometric authentication system for arbitrary text input. In *Proc. European Intelligence and Security Informatics Conference*. IEEE, 2013. (31% AR).
- EISIC'13 Ned Bakelman, **John V. Monaco**, Sung-Hyuk Cha, Charles C. Tappert. Keystroke biometric studies on password and numeric keypad input. In *Proc. European Intelligence and Security Informatics Conference*. IEEE, 2013. (31% AR).
- BTAS'13 **John V. Monaco**, John C. Stewart, Sung-Hyuk Cha, Charles C. Tappert. Behavioral biometric verification of student identity in online course assessment and authentication of authors in literary works. In *Proc. 6th IEEE International Conference on Biometrics: Theory, Applications and Systems*. IEEE, 2013. (53% AR).
- EISIC'12 **John V. Monaco**, Ned Bakelman, Sung-Hyuk Cha, Charles C. Tappert. Developing a keystroke biometric system for continual authentication of computer users. In *Proc. European Intelligence and Security Informatics Conference*. IEEE, 2012. (40% AR).
- DSS'12 D. Paul Benjamin, **John V. Monaco**, Yixia Lin, Christopher Funk, Damian Lyons. Using a virtual world for robot planning. In *Proc. Defense, Security, and Sensing: Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications*. SPIE, 2012.
- IJCB'11 John C. Stewart, **John V. Monaco**, Sung-Hyuk Cha, Charles C. Tappert. An investigation of keystroke and stylometry traits for authenticating online test takers. In *Proc. International Joint Conference on Biometrics*. IEEE, IAPR, 2011. (33% AR).
- AeroConf'11 D. Paul Benjamin, **John V. Monaco**, Yixia Lin, Damian M. Lyons. Comprehension and prediction of astronaut dynamics. In *Proc. 32nd IEEE Aerospace Conference*. IEEE, 2011.
- DSS'10 Damian M. Lyons, Sirhan Chaudhry, Marius Agica, **John V. Monaco**. Integrating perception and problem solving to predict complex object behaviours. In *Proc. Defense, Security, and Sensing: Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications*. SPIE, 2010.

Journal Articles

- JSS'18 **John V. Monaco**, Malka Gorfine, Li Hsu. General Semiparametric Shared Frailty Model Estimation and Simulation with frailtySurv. *Journal of Statistical Software*. FOAS, 2018.

- TCAS-I'17 **John V. Monaco**, Manuel M. Vindiola. Factoring Integers with a Brain-Inspired Computer. *IEEE Transactions on Circuits and Systems I*. IEEE, 2017.
- PR'17 **John V. Monaco**, Charles C. Tappert. The Partially Observable Hidden Markov Model with Application to Keystroke Biometrics. *Pattern Recognition*. Elsevier, 2017.
- CCPE'16 Jenny S. Li, Li-Chiou Chen, **John V. Monaco**, Pranjali Singh, Charles C. Tappert. Authorship Authentication of Social Networking Messages. *Concurrency and Computation: Practice and Experience*. Wiley, 2016.
- JSPS'16 Md Liakat Ali, **John V. Monaco**, Charles C. Tappert, Meikang Qiu. Keystroke biometric systems for user authentication. *Journal of Signal Processing Systems*. Springer, 2016.
- NCIJ'15 Gonzalo Perez, **John V. Monaco**, Charles C. Tappert, Li-Chiou Chen. Cybersecurity outreach for underrepresented minority students. *National Cybersecurity Institute Journal*. Excelsior College, 2015.
- AIR'14 Jonathan Leet, John Gibbons, Charles C. Tappert, **Vinnie Monaco**. Using a predefined passphrase to evaluate a speaker verification system. *Artificial Intelligence Research*. Sciedu, 2014.
- IJRCAIT'14 Lohit Jain, **John V. Monaco**, Michael J. Coakley, Charles C. Tappert. Passcode keystroke biometric performance on smartphone touchscreens is superior to that on hardware keyboards. *International Journal of Research in Computer Applications & Information Technology*. IASTER, 2014.

Patents

- 2018 Jordan A. Berger, **John V. Monaco**. Universal Keyboard. US Patent No 9,864,516. Filed on 27 July 2015. Published on 9 Jan 2018.

Honors and Awards

- 2017 **Early Career Award Nomination.**
Nominated by the *Computational and Information Sciences Directorate* for the annual lab-wide Early Career Award.
- 2017 **Best Paper Award.**
50th IEEE International Symposium on Circuits and Systems, out of 1339 paper submissions.
- 2016 **Runner-up Neuromorph of the Year.**
Telluride Neuromorphic Cognition Engineering Workshop.

- 2016 **1st Place.**
Keystroke Biometrics Ongoing Competition, part of the *8th IEEE International Conference on Biometrics: Theory, Applications, and Systems*.
- 2016 **3rd Place.**
Look & Click Competition, part of the *9th IAPR International Conference on Biometrics*.
- 2015 **Outstanding Student of the Year Award for Ph.D. in Computer Science.**
Seidenberg School of CSIS, Pace University, the highest honor given to a Seidenberg School student graduating with a doctoral degree.
- 2014 **1st Place.**
Second Eye Movement Verification and Identification Competition, part of the *2014 International Joint Conference on Biometrics*.
- 2013 **Westchester Wunderkind.**
Named one of Westchester's "Top Professionals Under 30" by *Westchester Magazine*.
- 2012 **Scholastic Achievement Award.**
Seidenberg School of CSIS, Pace University, for outstanding performance and research in a B.S. program.
- 2012 **Certificate of Honor.**
Dyson College, Pace University, for distinguished work in mathematics.
- 2012 **Honorable Mention.**
Computing Research Association, for biometrics research submitted to the Outstanding Undergraduate Researcher Award program.
- 2011-2015 **Information Assurance Scholarship Program.**
U.S. Department of Defense, national full-tuition + stipend scholarship awarded approximately 20 students annually.

Service and STEM Outreach

- 2017 **Instructor.**
Gains in the Education of Mathematics and Science III (GEMS III).
Held a full-day introductory cryptography workshop for high school students.
- 2017 **Instructor.**
Gains in the Education of Mathematics and Science II (GEMS II).
Held a series of cryptography workshops for middle school students.

- 2017 **Mentor.**
Mentored a summer intern, Aberdeen Proving Ground, MD.
- 2016-now **Advisor.**
Pace Cybersecurity Advisory Group, Pace University, Pleasantville, NY.
- 2015 **Chair.**
One-handed Keystroke Biometric Identification Competition, part of the *8th IAPR International Conference on Biometrics*.
- 2015 **Speaker.**
GenCyber Summer Workshop in Cybersecurity, Pleasantville, NY.
Held a tutorial on biometric authentication for high school teachers.
- 2013-2014 **Speaker.**
Pace Cybersecurity Academic Partnership (PCAP) Program.
Held several cybersecurity workshops aimed to reach underrepresented groups.

Reviewing

- International Symposium on Circuits and Systems (IEEE).
- Entropy (MDPI).
- IEEE Transactions on Emerging Topics in Computing (IEEE).
- Neurocomputing (Elsevier).
- Symmetry (MDPI).
- International Journal of Human-Computer Studies (Elsevier).
- EURASIP Journal on Information Security (Springer).

Teaching

Undergraduate

- CIS101 *Introduction to Computing.*
Instructor.
- CIS102W *Web Development.*
Teaching Assistant.

Graduate

- CS691 *Computer Science Projects.*
Teaching Assistant.
- CS855 *Pattern Recognition and Machine Learning.*
Teaching Assistant.

Invited Talks

- 2017 Addressable Memory on a Neuromorphic Computer.
Biannual Technical Advisory Board Review, Aberdeen Proving Ground, MD.
- 2016 Neuromorphic Computing.
IBM TrueNorth Boot Camp Reunion, Almaden, CA.
- 2016 You are when you eat.
ARL Colloquia and Science Caf , Aberdeen Proving Ground, MD.

Software Projects

- kloak** Keystroke-level online anonymization kernel, aimed to provide device-level anonymization in privacy-centric Linux distributions Whonix and Tails.
- frailtySurv** R package, implements a general semiparametric shared frailty model (part of Google Summer of Code 2016).
- BioAuth** Moodle plugin, uses keystroke biometrics to verify the identity of students taking online exams (part of Google Summer of Code 2013).
- pohmm** Python package, implements the partially observable hidden Markov model.