Curriculum Vitae

John V. Monaco

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Research Interests

- Digital payments and user/device transaction 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

2018–now **Assistant Professor**.
Naval Postgraduate School, Monterey, CA.

2016–2018 **Computer Scientist**.
U.S. Army Research Laboratory, Aberdeen, MD.

2016–2016 **Postdoctoral Fellow**.
U.S. Army Research Laboratory, Aberdeen, MD.
Mentor: Dr. Manuel M. Vindiola; funded through ORISE.

2014–2016 **Adjunct Professor**.
Pace University, Pleasantville, NY.

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'22 **John V. Monaco**. Device Fingerprinting with Peripheral Timestamps. In *Proc. 43rd IEEE Symposium on Security and Privacy*. IEEE, 2022.

SPW'21 Jihye Kim, **John V. Monaco**. User Identification in Dynamic Web Traffic via Deep Temporal Features. In *Proc. 2021 Systematic Approaches to Digital Forensic Engineering Workshop* (co-located with S&P 2021). IEEE 2021.

SSCI'20 Brett Rajchel, **John V. Monaco**, Gurminder Singh, Angela Hu, Jarrod Shingleton and Thomas Anderson. Temporal Behavior in Network Traffic as a Basis for Insider Threat Detection. In *Proc. 2020 IEEE Symposium Series on Computational Intelligence*. IEEE, 2020.

IJCB'20 Alejandro Acien, **John V. Monaco**, Aythami Morales, Ruben Vera-Rodriguez, Julian Fierrez. TypeNet: Scaling up Keystroke Biometrics. In *Proc. 2020 International Joint Conference on Biometrics*. IEEE/IAPR 2020. (39.3% AR).

COMPSAC'20 Aythami Morales, Alejandro Acien, Julian Fierrez, **John V. Monaco**, Ruben Tolosana, Ruben Vera-Rodriguez, Javier Ortega-Garcia. Keystroke Biometrics in Response to Fake News Propagation in a Global Pandemic. In *Proc. 2020 IEEE Annual Computers, Software, and Applications Conference*. IEEE, 2020.

NICE'20 **John V. Monaco**, Ryad B Benosman. General Purpose Computation with Spiking Neural Networks: Programming, Design Principles, and Patterns. In *Proc. 2020 Neuro-inspired Computational Elements Workshop*. ACM, 2020.

CHI'20 **John V. Monaco**. Bug or Feature? Covert Impairments to Human Computer Interaction. In *Proc. 2020 ACM Conference on Human Factors in Computing Systems*. ACM, 2020. (**Best Paper Award**, 24.3% AR).

USENIX'19 **John V. Monaco**. What Are You Searching For? A Remote Keylogging Attack on Search Engine Autocomplete. In *Proc. 28th USENIX Security Symposium*. USENIX, 2019. (16% AR).

SPW'19 **John V. Monaco**. Feasibility of a Keystroke Timing Attack on Search Engines with Autocomplete. In *Proc. 4th International Workshop on Traffic Measurements for Cybersecurity* (co-located with IEEE S&P 2019). IEEE, 2019.

SoutheastCon'19 Patrick Jungwirth, **John V. Monaco**. Digital Signal Processing-From Complex Numbers to the Hilbert Transform. In *Proc. IEEE SoutheastCon 2019*. IEEE, 2019.

ISCAS'18 Kevin Corder, **John V. Monaco**, Manuel M. Vindiola. Solving Vertex Cover via Ising Model on a Neuromorphic Processor. In *Proc. 51st IEEE International Symposium on Circuits and Systems*. IEEE, 2018. (53% AR).

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. EDSIG 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

TBIOM'21 Alejandro Acien, Aythami Morales, **John V. Monaco**, Ruben Vera-Rodriguez, Julian Fierrez. TypeNet: Deep Learning Keystroke Biometrics. *IEEE Transactions on Biometrics, Behavior, and Identity Science*. IEEE, 2021.

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**, Pranjal 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

2020 **Best Paper Award.**
2020 ACM Conference on Human Factors in Computing Systems, top 1% of paper submissions.

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.

2017 **Best Paper Award**
8th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference.

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

2021 **Program Co-Chair.**
Systematic Approaches to Digital Forensic Engineering (SADFE) Workshop, colocated with 2021 IEEE S&P.

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.

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

Program Committees

- SecureComm'20
- WTMC'20
- WTMC'19

Journals

- Pattern Recognition (Elsevier)
- Neural Computation (MIT Press)
- IEEE Transactions on Information Forensics & Security (IEEE)
- IEEE Transactions on Emerging Topics in Computing (IEEE).

- Neurocomputing (Elsevier).
- International Journal of Human-Computer Studies (Elsevier).
- EURASIP Journal on Information Security (Springer).

Teaching

(Academic Year/Quarter)

2021/3 *Artificial Intelligence* (CS3310)

2021/1 *Artificial Intelligence* (CS3310)

2020/3 *Artificial Intelligence* (CS3310)

2020/1 *Artificial Intelligence* (CS3310)

2019/3 *Artificial Intelligence* (CS3310), *Machine Learning/Data Mining* (CS4315)

2019/2 *Artificial Intelligence* (CS3310)

2019/1 *Artificial Intelligence* (CS3310)

Invited Talks

2020 Big Data/Big Brother
Rotary Club of Corral de Tierra. Online.

2020 Big Data/Big Brother
Carmel Public Library Foundation, Sunset Center, Carmel, CA.

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 Café, 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.