Valerie N. Nelson, Ph.D.

SUMMARY: Highly recognized and motivated mathematician, cybersecurity executive, data science and AI/ML leader, and education and training professional with a passion for data science, education, training and outreach at all levels, possessing over 20 years of experience in the intelligence field with a TS/SCI full scope polygraph clearance, approximately 20 years of college-level teaching experience and 20+ years of nontraditional teaching on a diverse range of topics to a variety of audiences- an optimal combination of strong technical, communication and leadership skills. Pioneer in the areas of instructional escape rooms, active learning strategies and data science applications to inform instruction and strategy. Experience includes corporate and departmental leadership for STEM workforce development (particularly in cybersecurity, data science, math, cryptanalysis); interdisciplinary curriculum and instructional design, train-the-trainer curricula, annual evaluation of grant proposals for STEM Research Experiences for Undergraduates (REU); academic enrichment and program coordination. 3rd degree Reiki practitioner and Suicide Alertness For Everyone (SAFE) Certified.

EDUCATION

- *Graduate*, Senior Technical Development Program, National Security Agency — October 2020
- *Graduate Certificate Data Science (4.0),* University of Maryland College Park — May 2019
- *Ph.D. Mathematics (3.79),* Howard University — December 2013
- *M.S. Mathematics (3.82),* Morgan State University — May 2009
- *B.S. Mathematics (3.73),* Morgan State University — May 1999
- *Graduate, AGEP/ Preparing Future Faculty,* Howard University — May 2012
- *Graduate,* Applied Mathematics Program, National Security Agency — September 2004
- *Graduate,* Real Estate Banking Credit School, Bank of America — March 2000
- *Graduate,* Leadership Development Institute, INROADS Inc. — August 1998

TECHNICAL EXPERIENCE

- *Senior Data Architect/Strategist, E Cyber7 Technologies, LLC, 2022-present.* Routinely engaged contractual customers to translate business needs into functional requirements; oversaw and assessed development of software, contractual documentation, and training materials against customer requirements; and oversaw user testing activities to obtain feedback for updates to deliverables via Agile development process. Provided recommendations to customers for adapting software deliverables and integrating new technology into operations. Prepared contract proposals, updated capability statements and product tri-folds, and drafted white papers describing functionality and benefits of E Cyber7 software products. Actively recruited and interviewed applicants, established monthly professional development workshop series for E Cyber7 workforce, and coached Mississippi Cyber Initiative staff through development and execution of a cyber camp with an instructional escape room for high schoolers.

- *STEM Technical Leader/Applied Research Mathematician, National Security Agency (NSA), 2000-2022.* Technical leader in the areas of cybersecurity, data science and AI/ML, academic outreach, and STEM workforce training (cybersecurity, data science mathematics, cryptanalysis, etc.). Applied cybersecurity, data science, software reverse engineering, cryptologic mathematics and cryptanalysis, signals analysis, network analysis, vulnerability assessment, combinatorial graph theory and forward error correction techniques and research to anticipate, address, and solve classified/unclassified problems related to national defense. Programming experience covers primarily Python with *some* C, C++, R, LaTeX, Unix/Linux with lots of use of Jupyter. Past experience with Maple, Matlab, Mathematica, Magma, SAS, Minitab, and General Assembly.

- *Commercial Real Estate Banking Relationship Underwriter/Manager, Bank of America, 1997-2000.* Facilitated and maintained customer relationships with portfolio exceeding $2 billion. Underwrote commercial real estate loans and performed financial, market, industry, and operational analyses of companies and clients. Created overview presentation for Mid-Atlantic Real Estate Division Executive to deliver at regional meetings.

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- ***Accounting Intern, Comsat Corporation, 1995-1996***. Performed accounting activities such as processing invoices (Accounts Payable), updating billing system with new account information, preparing journal entries for and updating the General Ledger, and assisting with Accounts Receivable.

SELECTED TEACHING APPOINTMENTS

- 2023-present ***Guest Adjunct Faculty***, *Computer Science Department* Howard University
- 2019-2022 ***UMBC Data Science Acad. Liaison,*** Acad. Outreach National Security Agency
- 2017-2019 ***Agency Lead,*** *Data Science Literacy Initiative* National Security Agency
- 2018-2019 ***Visiting Staff***, *Instructional Technologies Team* Univ. Maryland Baltimore County
- 2017-2018 ***Adjunct Faculty***, *Computer Science Department* George Washington University
- 2012-2019 ***Department Head,*** *MATH/CRYP/DATA Department* National Cryptologic School
- 2010-2012 ***Adjunct Faculty,*** *Mathematics Department* Howard University
- 2011-2018 ***Chief Instructor,*** *Comm. Public Awareness Council* Prince George's County, MD
- 2011-2012 ***GRE Prep Training Coordinator,*** *McNair Program* Howard University
- 2006-2008 ***Adjunct Faculty,*** *Mathematics Department* Morgan State University
- 2005-2022 ***Faculty,*** *MATH/CRYP/DATA,Signals Analysis Depts.* National Cryptologic School
- 2004-2006 ***Adjunct Faculty,*** *Dev't Math Department* Prince George's Community College

SELECTED TEACHING EXPERIENCE

- ***Instructional Technology Visiting Staff, University of Maryland Baltimore County, 2018-2019.*** Served on Department of Information Technology's instructional Technology Team to support and provide training on the use of learning technology tools, analytics, and pedagogical strategies for faculty and staff. Created and delivered first Jupyter training to faculty and staff for analyzing and visualizing institutional and class-level data; created a Jupyter notebook to process and present monthly metrics for Blackboard Collaborate session data, and served as a consultant for undergraduate data science curriculum. Introduced the concept of the instructional Escape Room for assessing student competencies, coordinated annual "Tech Fest" conference for school community, created faculty training for using analytics to inform instruction and strategy, and compiled competencies or basic data literacy curriculum. Led popular "Creating Instructional Escape Rooms for Traditional and Online Learning" workshop at 2019 Online Learning Consortium (later repeated). Researched and applied Competency-Based Education pedagogical framework as instructional strategy under CBE expert.

- ***Mathematics/Cryptanalysis/Data Science Department Head and Curriculum Manager, National Cryptologic School (NCS), NSA, 2012-2019***- Managed the development, scheduling, staffing, updating, evaluation and delivery of 75+ math, cryptanalysis, and data science courses for the global enterprise. Appointed as Agency Data Science Literacy Lead and Data Science Academic Liaison to UMBC. Revamped and trained instructors on coding theory curriculum for signals analysts. Introduced first Agency-wide "Academic Outreach Day" event. Devised and executed department strategic plan to maintain curricula relevance, assess and improve effectiveness, expand delivery options, and continually meet mission training needs. Created and implemented new Data Science curriculum, introduced and developed Instructional Escape Rooms, and delivered over 20 train-the-trainer workshops. Trained and developed full-time, part-time, and summer intern staff members in the science of learning to ensure the availability of job-relevant training. Established the Data Science curriculum and effort to populate it with relevant training. Introduced and implemented a repeatable framework for NCS to provide holistic internship experiences for operational employees.

- ***CEO/Owner, Training Keys, LLC/Amp It!, Prince George's County, 2013 - present***- Develop, implement and deliver training solutions in academics, corporate and STEM topics, professional development, personal development and wellness that translate into practical skills. Design and implement instructional and social escape rooms. Coordinate and execute training conferences, enrichment camps and community seminars, provide personal consultations and coaching, and train employees/volunteers to effectively deliver various training

services and provide self-development opportunities. Establish and leverage business partnerships, obtain grants, market business services. Evaluate and report on effectiveness of training services.

- ***Chief Instructor and Curriculum Coordinator, State's Attorney Office Family Justice Academy (formerly P.G. County Public Awareness Council (CPAC) Meeting of the Minds), Aug. 2011-present***- Devised and repeatedly implement curricula for weekly diversion program for youth; one curriculum includes academic achievement, organizational skills and time management, personal and professional development, conflict management, crime prevention, stress management, and personal wellness. Second curriculum includes youth assessment of individual academic and personal needs. Created onboarding training for staff. Evaluate effectiveness of curricula and revise as needed. Developed, coordinated and executed youth workshops at the first 2011 CPAC Teen Summit at Prince George's Community College with approximately 200 participants.

- ***Volunteer, Academic Outreach Activities, National Security Agency, 2000-2022-*** Participate in Math Education Partnership Program (MEPP) as a guest school STEM instructor and presenter, science fair judge, career day speaker, and mentor at local schools and colleges. Serve as a math tutor for the Partners In Education (PIE) program. Support the Math Sabbaticals Program (MSP) by semi-annually mentoring and speaking during panel discussion activities with NSA Scholars/Meyerhoff participants at UMBC; provide technical presentations to math REU participants and observe REU participant research presentations. Assist in coordination and participated as presenter in Women in STEM and STEM Festivals at the National Cryptologic Museum.

- ***Program Instructor, Junior Super Savers Club (JSSC), Bank of America/DC Public Schools/DC Dept. of Treasury, Spring/Summer 2000-*** Developed and implemented a two-week curriculum for program in DC Public Schools; program included instruction on fractions, decimals, percentages, interest and "money math", problem solving strategies, and case studies demonstrating practical applications of math with bank accounts.

PUBLICATIONS- EXTERNAL (NOT INTERNAL TO NSA)

- V. Nelson, J. Crea, *The Data Science Instructional Escape Room- a Successful Experiment*, CHANCE, **34** (2021) No. 2, pp. 53-58, DOI: 10.1080/09332480.2021.1915034.
- T. Diagana, V. Nelson, *Existence results for some higher-order evolution equations with operator coefficients*, Applied Mathematics and Computation **219** (2012), No. 6 pp. 2923-2931.
- T. Diagana, V. Nelson, G.M. N'Guerekata, *Stepanov-like $C^{(n)}$-pseudo almost automorphy and its applications to some higher-order differential equations,* Opuscula Mathematica **32** (2012), No. 3, pp. 455-471.
- T. Diagana, V. Nelson, *$C^{(n)}$- pseudo almost automorphy and its applications to some higher-order differential equations,* Nonlinear Studies **19** (2012), No. 3, pp. 1-13.
- V.Nelson, L. Shapiro, *Catalan Numbers, Pascal's Triangle, and Mutators,* Congress Numerantium **205** (2010), pp. 187-197.
- K. Ezzinbi, V. Nelson, G.M. N'Guerekata, *$C^{(n)}$-almost automorphic solutions of some nonautonomous differential equations*, CUBO A Mathematical Journal, **10** (2008), No. 2, pp. 61-74.

SELECTED HONORS/ACTIVITIES

2023 Program Chair Tapia Diversity In Computing Conference (Deputy Chair 2022, Govt/Industry Chair 2021) * 2023 Women In AI Nominee * Annual Time-Off & Cash Awards 2013-2022 * 2019 Research Directorate Coin * NCS 2018 Learning Enabler of the Year Award * 2018 Morgan State University Distinguished Alum Award * 2018 National Security Executives & Professionals (NSEPA) Shining Star Award * 2017 MSU Mathematics Department Shirley K. Russell Service Award * 2017 DISA Black History Month Keynote and Director's Coin * NCS 2017 Commandant's Award * NSA 2016 Technology Device Award * 2016 Blacks In Government Region XI President's Leadership Award * Department of Defense 2016 Spirit of Service Award Nominee * NCS 2016 Learning Enabler of the Year Nominee * NSA 2016 William E. Wilsey Memorial Award (Disability Affairs) * NSA 2016 Women In STEM Article Feature * NCS 2015 Faculty of the Year Nominee * Nominee NSA Mathematics Sabbaticals Program 2011-2020 REU Grant Review Committee * 2012 Best Research Poster Presentation- Blackwell Memorial Conference * 2011 Best Oral Research

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Presentation- Howard University Graduate Research Symposium * 2009 Best Group research Presentation Award- 1st Buea International Conference on Mathematics

2008 Best Research Poster Presentation- CAARMS14/AARCS 2008 * 2006 Math Horizons Magazine Article Feature HU Alliance for Graduate Education and the Professoriate (AGEP) Edward Bouchet Fellow * NSA Directed Studies Program Fellow * First Black Female Graduate of Applied Mathematics Program * Tri-City Chapter of Blacks In Government President * MSU Mathematics 2001 Alumnus of the Year * Golden Key National Honor Society * Alpha Kappa Mu Honor Society * National Dean's List * Who's Who in American Universities * Phi Eta Sigma and Alpha * Lambda Delta Scholastic Honor Society * Pi Mu Epsilon National Honor Society

*** *NOTE:*   *The information contained in this document represents only a small subset of activities, publications, and presentations conducted in the past several years that have been approved for public dissemination. More details can be provided via discussion upon request.*