

January 3, 2026

CURRICULUM VITAE

IAN MCCULLOH

PERSONAL DATA

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EDUCATION AND TRAINING

Ph.D/2009 Carnegie Mellon University, Computer Science
Thesis: Social Network Change Detection.
Advisor: Kathleen Carley

Graduate Certificate/2008 Univ of Pittsburgh & Carnegie Mellon, Network Science

MS/2008 Carnegie Mellon University, Computation, Organization, and Society
(Computer Science, Organizational Behavior, and Social Psychology)

Graduate Certificate/2005 U.S. Military Academy, Pedagogy

MS/2004 Florida State University, Applied Statistics

MS/2004 Florida State University, Industrial Engineering

BS/1994 University of Washington, Industrial Engineering

PROFESSIONAL EXPERIENCE

AI Portfolio Manager, Executive & Professional Education, 2024-present, Johns Hopkins University

Lead the AI executive and continuing education portfolio for Johns Hopkins University Whiting School of Engineering, driving lifelong-learning growth strategy and commercialization. Launched 60+ continuing-ed courses in first 6 months; negotiated Great Learning partnership fielding 7 courses generating ~\$24M in annual program revenue; sustained triple-digit YoY growth with consistent NPS 50+.

Founding Owner and Chief Technology Officer, 2014-present, Arrow Analytics.

Principal Partner at an AI and data science boutique delivering machine learning, graph analytics, and social neuroscience solutions across public and private sectors. Lead applied neuroimaging R&D (including miniaturized fNIRS for ecologically valid studies) and network-based clustering methods for monitoring cyber, communications, and organizational networks. Clients include F500, federal R&D, universities (Rutgers, Johns Hopkins, UT), and industries spanning healthcare, finance/credit unions, pharma, private equity, education, manufacturing, and telecom.

Adjunct 2015-present, Johns Hopkins Univ, Whiting School of Engineering.

Design and teach 8 graduate courses spanning AI, statistics, neuroscience, and social computing, and deliver executive/professional education in AI, generative AI, and agentic AI; advise master's and doctoral students. Consistently rated in the top 10% of faculty on end-of-course surveys. Founded Johns Hopkins' Social Networks group (150+ scholars) and created the North American Social Networks (NASN) conference, leading its first three meetings.

Assoc Prof, 2016-, Johns Hopkins University, Bloomberg School of Public Health,

Joint appointment in the Department of Health Behavior and Society. Teach a graduate course in communication network analysis in public health programs. Conduct research in the area of social neuroscience and technology development for behavioral intervention, product testing, and evaluation. Co-advisor for two Ph.D. students.

Chief Data Scientist, 2018-2023, Accenture Federal Services.

Founded and led Accenture Federal Services' Data Science & AI practice as Managing Director and Chief Data Scientist, modernizing U.S. Government mission and citizen services with production-scale AI. Scaled the practice **from ~30 to 1,200+** data scientists/engineers in four years and **grew to ~\$1.5B in annual revenue**, delivering five of the largest at-scale AI deployments in the U.S. Government across decision support, fraud detection, and process automation. Built and managed a major delivery ecosystem across hyper-scalers and enterprise platforms (AWS, Azure, Google Cloud, Salesforce, ServiceNow, Pega, Tableau)

Chief Scientist, 2015-18, Johns Hopkins University Applied Physics Laboratory.

Establish research strategy for a 60+ member software and data science group and mentor junior to mid-career staff ranging from graduate to Ph.D. in grant/proposal writing, research, publication, and applied engineering. Recent focus has been in online influence and persuasion, social engineering, social network analysis, and neural marketing. Principal investigator on multiple basic and applied research grants.

Research Fellow, 2009-2015, Curtin Univ. Business School, Perth, W. Australia

Designed and taught graduate level courses in social network analysis as intensive courses once each year. Mentored graduate students. Conducted research in organizational behavior as a senior scientist in the Centre for Organisational Analysis, which I co-founded. Primary advisor to one Ph.D. student and one masters student.

Lieutenant Colonel, 1995-2015, U.S Army.

Served 20 years as a commissioned officer in the U.S. Army, with assignments spanning CBRN defense, Special Forces, information/influence operations, offensive cyber operations, and analytic roles in AI/network science research and operations research; key positions are listed separately.

Information Operations Strategist, 2012-2015, U.S. Central Command.

Selected by GEN James N. Mattis to serve as Chief of Offensive Cyber Operations and Chief Strategist for Information Operations—his #1 and #3 priorities. Led multiple special operations deployments across the Middle East and Central Asia, supporting unconventional warfare and psychological operations (including Operation Inherent Resolve in Syria and Northern Iraq), and deployed to Afghanistan to train intelligence and SOF units in advanced network-based targeting methods. Integrated the full corpus of available U.S. and U.K. cultural and population data on Iraq and Syria to inform

operational planning and assessment, and launched an independent third-party academic research program to generate externally validated findings that shaped U.S. strategy—work later synthesized in my book, *ISIS in Iraq*. In addition, served as Principal Investigator for a \$5M/year appropriated research program, leading a team of 5 Ph.D.s and a physicist/statistician conducting mixed-methods fieldwork across 15 countries (including the largest cultural domain analysis data collection to date) to inform and evaluate multi-million-dollar influence campaigns countering terrorist radicalization; reengineered a \$26M/year online counter-radicalization program by introducing machine-learning-based assessment to increase measured effectiveness while reducing costs by >\$7M/year.

Strategy & Assessments Chief, 2011-2012, US Special Operations Cmd. Central

Conducted computational social science research, academic outreach, and strategy consulting to provide operational understanding for theater special operations in the Middle East. Manage seven people and a \$2 Million budget. Developed an indigenous data collection network in an adversarial nation and conducted mixed methods, primary research. Developed multiple influence programs to advance US interests throughout the region

Senior Scientist, 2006-2012, US Military Academy, Network Science Center

Founded and directed the U.S. Military Academy's flagship Network Science Center, building faculty collaborations across 11 of 13 academic departments. Led interdisciplinary research applying statistical network models to explain group formation, behavior change, collaboration, and ideological diffusion, and translated findings into operational methods for ethically and effectively mining intelligence and forensic data into structured networks for targeting support. Established West Point's first classified research facility and built the center into the DoD's focal point for network-based targeting R&D and training, supporting partners including JSOC/SKOPE, NSA, NGA, JIEDDO, and COIC. Led teams providing real-world analytic support for complex intelligence operations in Afghanistan and Iraq; early video-exploitation methods developed through this effort were credited with a ~75% reduction in sniper and IED attacks against U.S. forces.

Assistant Professor, 2007-2012, United States Military Academy.

Held joint appointments in the Departments of Mathematical Sciences, Behavioral Sciences and Leadership, and Civil and Mechanical Engineering. Taught 48 undergraduate courses, advised undergraduate research, and conducted research of importance to the US Army. Served as the math and operations research academic advisor. Faculty representative to the Men's Tennis Team (2004-7), and Pipes and Drums (2005-10).

Chief, Counter Improvised Explosive Device Ops, 2010-2011, US Forces Iraq.

Responsible for reducing the threat of improvised explosive devices (IED) as the US withdrew from Iraq. Conducted network analysis and targeting, statistical analysis, and applied other analytic methods to attack threat networks with lethal and non-lethal targeting. Responsible for managing half the computer bandwidth in Iraq. Managed 74 people in 13 locations throughout Iraq. Conducted human ethnography in a non-permissive Mosul to design the 2011 Neutralizing Al-Qaida in Iraq (NAQI) influence campaign. Designed the most effective influence campaign in the Iraq war that increased the indigenous Iraqi judiciaries' willingness to convict terrorists of crimes. Taught a course in social network analysis in Arabic to Iraqi law enforcement.

Assoc Prof (non-tenured), 2010-2011, University of Maryland Baltimore County.
Served as an adjunct associate professor for UMBC in Baghdad, Iraq teaching undergraduate mathematics and social network analysis to deployed soldiers.

Adjunct Professor, 2010-2011, Central Texas College
Served as an adjunct professor teaching terrorism and leadership in Iraq.

Analyst, 2009-2010, Combined Joint Task Force Paladin, US Force Afghanistan.
Social network analysis (SNA) subject matter expert responsible for determining how SNA can improve intelligence targeting. Increased the efficiency of intelligence targeting enabling analysts to identify targets in less than 10% of the time it took previously. Developed a 40-hour training course that has been adopted by the US Army Training Readiness and Doctrine Command (TRADOC) who trains Brigade Combat Teams and higher echelons prior to deployment to combat.

Adjunct Professor, 2006-2011, Saint Thomas Aquinas College
Served as an adjunct professor teaching 16 courses ranging from math to computer science to social science.

Adjunct Professor, 2005-2011, Mount Saint Mary College
Served as an adjunct professor teaching 5 courses in math and public speaking.

Assoc Scientist, 2005-2007, Combating Terrorism Center, US Military Academy.
Research scientist in the area of biological weapons defense. Arranged academic panels and qualitative research in the area of biological weapons defense. Started the journal, “the Bio-Defense Report”, which was renamed the “Sentinel” in 2007 and now focuses more broadly on terrorism research.

Instructor, 2004-2006, United States Military Academy.
Taught mathematics and applied statistics to undergraduate students. Conducted research of importance to the Army. Coach of the Women’s Rugby Team leading them to their first national ranking (2004-5).

Company Commander, 2000-2002, 11th Chemical Company (Smoke/Decon)
Commander of a 169-soldier smoke/decon chemical company in support of First Corps. Mentored 11 lieutenants who remained on active duty to make a positive future impact to the Army. Cited by the Corps Commander for having the best maintenance program in the Corps and an arms room, supply, and CBRN program in the top 10% on post. Created a positive command climate as evidenced by the highest re-enlistment rate in the Corps (188% of quota).

Detachment Commander, 1999-2000, Operational Special Reconnaissance (A-Team), 1st Special Forces Group

Commander of an elite 10-man special forces detachment focused on special reconnaissance and contaminated exfiltration. Transformed the detachment from an ineffective unit into the premier decontamination asset in Special Operations Command. Trained Navy SEALs and Special Forces teams in new decontamination techniques that greatly enhanced their war-fighting capability. Developed 80% of special operations tactics, techniques and procedures still in use for special operations against weapons of mass destruction (WMD).

Lieutenant, 1994-1999, 10th Mountain Division

Served in multiple operational assignments from Chemical Officer, 3-17 Air Cavalry Squadron to Platoon Leader of a 36-soldier smoke and chemical/biological decontamination platoon (deployed to the Middle East), and completed service as Executive Officer, 59th Chemical Company. As Officer-in-Charge of 3-17 Cavalry's Aviation Mission Planning System (AMPS), led the Army's first tactical deployment of a distributed computing system and pilot effort for Force XXI, enabling networked mission planning and situational awareness at the tactical edge. Helped field key AMPS innovations including the "SITSTAT," a precursor to DoD Blue Force Tracker, and a pioneering capability to transmit compressed helicopter video (OH-58D Kiowa Warrior) over secure, scrambled FM to mobile subscriber equipment—allowing division-level and higher commanders to view near real-time imagery of deployed units for the first time.

Owner, 1993-1994, McCulloh-Anderson-Chow (MAC) Consulting

Established an industrial engineering consulting business in Seattle Washington (10 employees). Client projects included ISO9000 certification for GM Nameplate, time and motion studies with process improvement for CaterAir, and improving predictive maintenance for CityIce Cold Storage.

PROFESSIONAL ACTIVITIES

Advisory Board, Summit – (1/2025 – present)

Advisory Board, Harrisburg University Analytics Program – (2020 – present)

Advisory Board, George Mason Univ. Data Analytics and Engr Program - (2020-2023)

Association for Computing Machinery – (2019 – present)

Association for the Advancement of Artificial Intelligence – (2009 – present)

International Network of Social Network Analysis – (2007 – present)

Society for Artificial Intelligence and Social Behavior Modeling (2009 – present)

USMA Network Science Center – (Founding Member 2006 – 2012)

USMA Combating Terrorism Center – (Associate for Chem/Bio Terrorism 2005-2007)

USMA Center for Data Analysis and Statistics – (Assistant Director 2005-2006)

Military Operations Research Society – (Working Group Co-Chair 2004-2006)

Pi Mu Epsilon – Mathematics Honors Fraternity (Inducted 2007)

Omega Rho – Operations Research Honors Fraternity (Inducted 2006)

Chemical Corps Regimental Association (1995 – 2015)

Sigma Alpha Mu – Social Fraternity (President 1993-1994)

Phi Theta Kappa – Honors Fraternity (Vice-President 1988-1989)

Co-Chair, 3rd North American Social Networks (NASN) Conference, DC JAN 2021.

Chair, AAAI 2019 Fall Symposium on Human-Centered AI: Trustworthiness in Data and Algorithms, Arlington VA, NOV 2019.

Chair, 2nd North American Social Network (NASN) Conference, Wash. DC, NOV 2018.

Chair, 1st North American Social Network (NASN) Conference, Wash. DC, 26-30 July '17

Chair, ORSA Paloosa, New Embassy Complex, Baghdad, Iraq, 5-6 November 2010.

Chair, Workshop on Network Applications for Military Intel, West Point, 28 Oct 2009.

Programs and Session Committee, 29th Int'l Social Network Analysis Conference (Sunbelt), San Diego, CA, Mar 2009

Chair, 1st IEEE Network Science Workshop, West Point, 15-18 Oct 2008.

Integration Committee, Military Operations Research Society Social Networks
Symposium, Chicago, April 2008
Chair, 2nd USMA Network Science Workshop, West Point, 16-19 Oct 2007.
Transportation Coordinator, Graph Theory Day 52, West Point, May 2007.
Committee Memb, 1st USMA Network Science Workshop, West Point, 16-18 Apr 2007.
Co-Chair, Military Ops Research Society Working Group 2, Colorado Springs, June 2006.
Co-Chair, Military Ops Research Society Working Group 2, West Point, June 2005.

EDITORIAL ACTIVITIES

Peer Review Activities (Order of Prestige)

Journal of Social Networks
Journal of Mathematical Sociology
Journal of Network Science
Journal of Computational Mathematics of Organizational Theory
Journal of Social Structure
Connections
IEEE Network Science
IEEE Systems, Man, Cybernetics Part A
Western Academy of Management Journal
Artificial Intelligence and Social Behavior Modeling Journal
5th UK Social Networks Conference Proceedings

Editorial Board Membership

Associate Editor, Frontiers in Big Data, 2018-present
Connections, Area Editor for Mathematics and Graph Theory, 2016-present
Connections, Editorial Board, 2010-present
Comp. Mathematics of Organizational Theory, Editorial Board, 2015-present
Bio-Defense Report (Now Sentinel), Founding Editor, 2005-2007

HONORS AND AWARDS

Sidney D. Drell Academic Intelligence Achievement Award, Intelligence and
National Security Alliance (INSA), 2013
Order of the Dragon, Career Achievement Award, U.S. Army Chemical Corps, 1999

Military Awards Include: Legion of Merit, Defense Meritorious Service Medal w/ Oak Leaf Cluster, Meritorious Service Medal w/ 3 Oak Leaf Clusters, Army Commendation Medal w/ Oak Leaf Cluster, Joint Service Achievement Medal, Army Achievement Medal w/ Oak Leaf Cluster, Inherent Resolve (Syria) Service Medal, Iraqi Service Medal w/ 3 campaign stars, Afghanistan Service Medal w/ 2 campaign stars, Southwest Asia Service Medal, Expeditionary Service Medal, Korea Service Medal, Global War on Terror Service Medal, National Defense Service Medal w/ star, Humanitarian Service Medal, Military Outstanding Volunteer Service Medal, and the Overseas Service Medal

PUBLICATIONS

101 Journal Articles and Peer Reviewed Publications.
Classified peer reviewed publication not included.

McCulloh, I. & Newton, S. (under review). Strain Theory as a Driver of Violent Extremism. *Journal of Dynamics of Asymmetric Conflict*.

McCulloh, I. & Rasmussen, P. (Under Review). Expression Lost in Translation: Quantifying VR Avatar Fidelity in Neuromarketing and Therapy. In *Proc NeurIPS 2024*. Vancouver, Canada: NeurIPS.

McCulloh, I. & Dagher, M. (Under Review). Exploring Neural Correlates of Cooperation and Compromise in Sectarian Contexts Using Functional Near-Infrared Spectroscopy (fNIRS). In *Proc NeurIPS 2024*. Vancouver, Canada: NeurIPS.

Pilaud, M., Berges, A. J., & **McCulloh, I.** (2025). Mislabeling Misinformation: Annotation Consistency Shapes Machine Learning for DIY Health Risks. In *International Conference on Advances in Social Networks Analysis and Mining* (pp. 100-108). Cham: Springer Nature Switzerland.

Pilaud, M., & **McCulloh, I.** (2025). Cross-Subreddit Behavior as Open-Source Indicators of Coordinated Influence: A Case Study of r/Sino & r/China. In *International Conference on Advances in Social Networks Analysis and Mining* (pp. 13-20). Cham: Springer Nature Switzerland.

Hew, G., & **McCulloh, I.** (2025). Who Leads in the Shadows? ERGM and Centrality Analysis of Congressional Democrats on Bluesky. *arXiv preprint arXiv:2507.16858*.

McCulloh, I., Rodriguez, P., Kumar, S., Gupta, M., Sharma, V. R., Johnson, B., & Johnson, A. N. (2025). Generative AI in Computer Science Education: Accelerating Python Learning with ChatGPT. *arXiv preprint arXiv:2505.20329*.

McCulloh, I., Older, M., McCulloh, A. (2024). The Paradox of Food Addiction and the Obesity Epidemic: A Public Health Perspective. *JMIR Informatics*.

Lowetz, C. & **McCulloh, I.** (2024). Russian Invaders on the Internet's Front Page – A Survey of Behaviors in Ukraine-Related Subreddits. In *Proc. 2024 IEEE/ACM Foundations of Open Source Intelligence and Security Informatics*. Calabria, Italy: IEEE & ACM.

McCulloh, I., Bergamini, R. & Mackey, C. (2024). Echoes of War: How Reddit Narratives Shape Sectarian Views of the Israel-Hamas War. In *Proc. 2024 IEEE/ACM Foundations of Open Source Intelligence and Security Informatics*. Calabria, Italy: IEEE & ACM.

Erasala, R., **McCulloh, I.** (2024). Tweets to Touchdowns: Predicting NFL Achievement from Social Media Optimism. In *Proc. International Conference on Sports Analytics and Data Visualization (ICSADV 2024)*. New York, NY: WASET.

Cohen, B., **McCulloh, I.** (2023). Fragile Minds: Exploring the Link Between Social Media and Young Adult Mental Health. In *Proc. 2023 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Kusadasi, Turkey: IEEE & ACM.

Duncan, C., **McCulloh, I.** (2023). Unmasking Bias in Chat GPT Responses. In *Proc. 2023 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Kusadasi, Turkey: IEEE & ACM.

Yang, C., Reyes, D., Henry, M., Walker, L., Moran, M., Mathews, A., Page, K., Latkin, C., Tucker, J., **McCulloh, I.** (2023). A neuro-influence experiment to evaluate the persuasiveness of PrEP promotion messages among men who have sex with men: A randomized control trial. *JMIR Research Protocols*. 29/09/2023:52546 (forthcoming/in press) <http://doi.org/10.2196/preprints.52546>

McCulloh, I., Stewart, D., Kiernan, K., Yazicioglu, F., Patsolic, H., Zinner, C., Mohan, S., Cartwright, L. (2023). An experiment on the impact of predictive analytics on kidney offer acceptance decisions. *American Journal of Transplantation*. 23(7): 957-965

McCulloh, I., Placona, A., Stewart, D., Gause, D., Kiernan, K., Morgan, S., Zinner, C., Cartwright, L. (2023). Improving clinical decision making for organ transplant with AI. In *Proceedings, Cognitive Control and Goal-Driven Decision-Making (ICCCGDDM 2023)*. New York, NY: WASET.

McCulloh, I., Zinser, M., Patsolic, J., Ramos, M. (2023) Impact of Similarity Ratings on Human Judgement. In *Proceedings, International Conference on Semantics-Enabled Recommender Systems and Applications (ICSERSA 2023)*. New York, NY: WASET.

Kent, T.G., Phillips, N.E., **McCulloh, I.**, Pavon-Harr, V., Patsolic, H.G. (2021). Microscopic Markov Chain Approach for Measuring Mobility Driven SARS-CoV-2 Transmission, In *Proceedings Complex Networks 2021*. Springer.

Heymann, D., Pavon-Harr, V., Schwantes, C., **McCulloh, I.** (2021). Methods in Constrained Community Detection: An Integer Optimization Model and Heuristic Approach for Cohort Creation, In *Proceedings 2021 Eighth International Conference on Social Network Analysis, Management and Security (SNAMS)*. IEEE.

Stevens, N.T., Wilson, J.D., Driscoll, A.R., **McCulloh, I.**, Michailidis, G., Paris, C., Paynabar, K., Perry, M.B., Reisi-Gahrooei, M., Sengupta, S. & Sparks, R. (2021) Broader impacts of network monitoring: Its role in government, industry, technology, and beyond, *Quality Engineering*, DOI: 10.1080/08982112.2021.1974036.

Stevens, N.T., Wilson, J.D., Driscoll, A.R., **McCulloh, I.**, Michailidis, G., Paris, C., Paynabar, K., Perry, M.B., Reisi-Gahrooei, M., Sengupta, S. & Sparks, R (2021) Research in network monitoring: Connections with SPM and new directions, *Quality Engineering*, DOI: 10.1080/08982112.2021.1974035

Stevens, N.T., Wilson, J.D., Driscoll, A.R., **McCulloh, I.**, Michailidis, G., Paris, C., Paynabar, K., Perry, M.B., Reisi-Gahrooei, M., Sengupta, S. & Sparks, R (2021) The
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interdisciplinary nature of network monitoring: Advantages and disadvantages, *Quality Engineering*, DOI: 10.1080/08982112.2021.1974034

Stevens, N.T., Wilson, J.D., Driscoll, A.R., **McCulloh, I.**, Michailidis, G., Paris, C., Paynabar, K., Perry, M.B., Reisi-Gahrooei, M., Sengupta, S. & Sparks, R (2021) Foundations of network monitoring: Definitions and applications, *Quality Engineering*, DOI: 10.1080/08982112.2021.1974033

Koshute, P., Zook, J., **McCulloh, I.** (2021). Recommending Training Set Sizes for Classification. arXiv. <http://arxiv.org/abs/2102.09382>

Oler, M., Johnson, A., McCulloh, A., Dagher, M., Day, A., **McCulloh, I.** (2021). Reforming Sectarian Beliefs in Iraq: Winning the Peace. *Journal of Communication, Society and Media*. 4 (1): 8-25.

Kahn, L., **McCulloh, I.**, (2021). Getting Through the Trough of Artificial Intelligence (AI) Disillusionment with a Human-Centered Digital Twin Framework. *Proc. AAAI 2021*. AAAI.

Williams, E., Novak, V., Blackwell, D., **McCulloh, I.**, Phillips, N. (2020). Homophily and Transitivity in Bot Disinformation Networks. In *Proc. Seventh International Conference on Social Networks Analysis, Management and Security (SNAMS)*. Paris: IEEE.

McCulloh, I., Ellis, N., Savas, O., Rodrigues, P. (2020). Assessing e-Recruiting on Social Media: FBI Case Study. In *Proc. 2020 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Hague: IEEE & ACM.

Kahn, L., **McCulloh, I.** (2020). Simulating the Impact of Artificial Intelligence Innovations with a Modular Framework and Digital Twin. In *Proceedings of the 2020 Winter Simulation Conference*. IEEE & ACM.

Lin, J., Lam, S., Savas, O., **McCulloh, I.** (2020). Approaches for quantifying video prominence, narratives, & discussion: Engagement on COVID-19 public health interventions YouTube videos. In *Proc. 2020 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Hague: IEEE & ACM.

Williams, E., Levin, D., **McCulloh, I.** (2020). Improving LDA Topic Modeling with Gamma and Simmelian Filtration. In *Proc. 2020 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Hague: IEEE & ACM.

McCulloh, I., Savas, O. (2020). k-Truss Network Community Detection. In *Proc. 2020 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Hague: IEEE & ACM.

Cooper-White, M.A., Gillespie, G.S.R., Burns, S.M., **McCulloh, I.**, Ames, D.L., Dagher, M., Falk, E.B., Lieberman, M. (2020). A Synchrony-Based Classification Approach for Predicting Attitudes Using fNIRS. *Journal of Social Cognitive and Affective Neuroscience*. nsaa, <https://doi.org/10.1093/scan/nsaa115>

McCulloh, I., Kiernan, K., Kent, T. (2020). Improved Estimation of Daily COVID-19 Transmission Rate from Incomplete Data. *Proc. COMPandemics2020*. IEEE.

Lam, S., Hohman, E., Pavon-Harr, V., Patsolic, J., Schwantes, C., Willner, M., Schulz, K., Kent, T., Kiernan, K., **McCulloh, I.** (2020). Social determinates of health and COVID-19 mortality rates at the county level. *Proc. COMPandemics2020*. IEEE.

McCulloh, I., Kiernan, K., Kent, T. (2020). Inferring True COVID19 Infection Rates from Deaths. *Frontiers in Big Data Medicine and Public Health*.

McCulloh I., Savas O., & Ortiz B. (2020) Social Judgement Theory: A Network Based Implementation. *Proc. of the 2019 Winter Simulation Conference*. National Harbor, MD.

Savas, O., Ding, L., Papaleo, T., and **McCulloh, I.** (2020). Adversarial Attacks and Countermeasures against ML Models in Army Multi-domain Operations. *Proc. of the Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications II, SI20 SPIE Defense + Commercial Sensing Symposium*. Anaheim, CA.

Ortiz Ulloa, B., Kahn, L., Bosch, M., Bogden, P., Savas, O. **McCulloh, I.** (2020). Improving Community Resiliency and Emergency Response With a Multi-Pronged Artificial Intelligence System. *ISCRAM 2020*.

Nassar, J., Pavon-Harr, V., Bosch, M., **McCulloh, I.** (2019). Assessing Data Quality of Annotations with Krippendorff's Alpha for Applications in Computer Vision. In *Proc. AAAI 2019 Fall Symposium*. Arlington, VA: AAAI

Sehatbakhsh, N., Daw, E., Savas, O., Hassanzadeh, A., **McCulloh, I.** (2019) Security and Privacy Considerations of Machine Learning Models Deployed in the Government and Public Sector. In *Proc. AAAI 2019 Fall Symposium*. Arlington, VA: AAAI

Grubner, S., Piorkowski, J., & **McCulloh, I.** (2019). Social Media as a Main Source of Customer Feedback – Alternative to Customer Satisfaction Surveys. In *Proc. 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Vancouver, BC: IEEE & ACM.

Hegde, M., **McCulloh, I.**, Piorkowski, J. (2019). Examining Massive Open Online Course (MOOC) superposter behavior using social network analysis. In *Proc. 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Vancouver, BC: IEEE & ACM.

Rashed, M., Piorkowski, J., **McCulloh, I.** (2019) Evaluation of Extremist Cohesion in a Darknet Forum Using ERGM and LDA. In *Proc. 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*. Vancouver, BC: IEEE & ACM.

Tackacs, R. and **McCulloh, I.** (2019). Dormant Bots in Social Media: Twitter and the 2018 U.S. Senate Election, In *Proc. of the 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*. Vancouver, BC: IEEE/ACM.

Savas, O., Ortiz-Ulloa, B., and **McCulloh, I.** (2019). Causal Analysis of Online Outcomes of Interactions between Organic and Inorganic Accounts, In *Proc. of the 2019 International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation (SBP-Brims)*. Washington, DC: Springer.

Bargar, A., Pitts, S., Butkevics, J., & **McCulloh, I.** (2019, May). Challenges and Opportunities to Counter Information Operations Through Social Network Analysis and Theory. In *2019 11th International Conference on Cyber Conflict (CyCon)* (Vol. 900, pp. 1-18). IEEE.

Burns, S.M., Barnes, L.N., **McCulloh, I.**, Dagher, M., Falk, E.B., Lieberman, M.D. (2019). Making social neuroscience less WEIRD: Neural signatures of persuasive influence in the Middle East as measured with fNIRS. *Journal of Personality and Social Psychology*.

Reed, A., Piorkowski, J., & **McCulloh, I.** (2018). Correlating NBA Team Network Centrality Measures with Game Performance. In *Proceedings 2018 IEEE/ACM Conference on Advances in Social Network Analysis and Mining 2018*. Barcelona, Spain: IEEE/ACM.

Sadayappan, S., Piorkowski, J., & **McCulloh, I.** (2018). Evaluation Political Party Cohesion Using Exponential Random Graph Modeling. In *Proceedings 2018 IEEE/ACM Conference on Advances in Social Network Analysis and Mining 2018*. Barcelona, Spain: IEEE/ACM.

McCulloh, I., Cohen, R., Takacs, R. (2018) Better Quality Classifiers for Social Media Content: Crowdsourcing with Decision Trees. In *Proceedings 6th International Conference on Advanced Computing, Networking, and Informatics*. Silchar, India: Springer.

McCulloh, I., Burck, J., Behling, J., Burks, M., Parker, J. (2018) Leadership of Data Annotation Teams. In *Proceedings Social Sens 2018*. Orlando, FL: IEEE.

McCulloh, I. (2018). IkeNet: Email and Friendship Evolution. *Connections*, 36(1).

McCulloh, I., McCulloh, L. (2018). Knowing the Terrain: Explicit and Implicit Measures of the Population. In *SMA White Paper What Do Others Think and How Do We Know What They Are Thinking?* (Ed. M. Yager). Washington DC: Office of Secretary of Defense.

McCulloh, I., Seese, G. (2017). Assessing Neural Bases of Persuasion with Functional Near Infrared Spectroscopy (fNIRS) in Amman, Jordan. *Johns Hopkins Applied Physics Laboratory Technical Report AOS-17-0198*. February 2017. Laurel, MD.

McCulloh, I., Healy, S., Markakis, P. (2017). Characterization of Open Resources for Planning and Understanding Strategies (Corpus). *Johns Hopkins Applied Physics Laboratory Technical Report AOS-17-0196*. February 2017. Laurel, MD.

McCulloh, I. & Perrone, A. (2017). Review of R Packages for Social Network Analysis. In *Encyclopedia of Social Network Analysis and Mining*, (Ed. Reda Alhajj and Jon Rokne). Berlin: Springer.

McCulloh, I. & Newton, S. (2016). Social Strain as a Driver of Violent Extremism: Strain Theory and Emotions. *Johns Hopkins Applied Physics Laboratory Technical Report AOS-17-0038*. December 2016. Laurel, MD.

McCulloh, I. (2016). Neuroscience of Influence. In *Bio-Psycho-Social Determinants of Behavior* (Ed. Jason Spitaletta). Washington DC: Office of Secretary of Defense.

Moore, C.L., Steed, B., Shaikh, S., Eyre, D., **McCulloh, I.**, Spitaletta, J., Munch, R., Worret, C. (2016). *SMA White Paper: Maneuver and Engagement in the Narrative Space*. Washington DC: Office of Secretary of Defense.

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PRACTICE ACTIVITIES

Under an NIH grant and in collaboration with a physician, developed a rapid, AI-enabled screening approach for Alzheimer's diagnosis using a ~5-minute protocol. Built custom LLM-based feature extraction to derive reliable acoustic and linguistic markers, then fused these signals in a mixture-of-experts ensemble (decision-tree experts) to achieve ~90% classification accuracy—substantially improving on standard blood testing (~50% accuracy) and multi-hour clinical neuropsychological workflows (~70% accuracy). The protocol is preparing to enter clinical trials.

Invited speaker at a NATO conference on Responsible AI and AI regulation. Presented research on how Russian and Chinese influence operations can shape Western perceptions of AI governance, highlighting risks of naïve regulatory assumptions and policy capture. Introduced a novel regulatory-cooperation model to help allies compare approaches to AI regulation, strengthen alignment, and improve resilience against adversarial propaganda and corporate monopolies.

Technical lead guiding the development of enterprise data-tagging standards to enable Attribute-Based Access Control (ABAC) in support of DoW Zero Trust requirements. Lead cross-government technical coordination across 37 federal agencies, reconciling hundreds of heterogeneous requirements into a coherent, implementable, and auditable tagging approach.

Leading the development of Brain-Gaze, a web-based tool for non-invasive measurement of synaptic dopamine levels via eye-tracking and computer-vision based facial expression recognition. This tool will enable diagnostics for medication management for dopamine-deficient illness such as addiction recovery, Parkinson's, Huntington's, and other conditions.

UK AI Fest. Invited keynote speaker at the primary UK Ministry of Defence (MoD) artificial intelligence (AI) conference. The talk "Beyond the Algorithm" focused on responsible AI, human bias, and real-world examples of how AI can engineer inequity and life-ending mistakes out of manual solutions offering a different perspective on AI regulation.

Internal Revenue Service (IRS). Enhanced a machine learning solution using neural networks and decision trees to identify fraudulent tax returns. Increased machine learning performance. Reduce time and cost to train models by introducing automated feature selection with principal component analysis. Introduced a test for model overfitting to ensure superior performance in production. Corrected incumbent graph analytics module enabling the detection of ~\$15B in fraud from organized crime.

United Network for Organ Sharing (UNOS). At the time of this project one out of four donated kidney organs are discarded without finding a patient recipient, while five to ten

thousand people die on the waitlist each year. McCulloh designed a behavioral study to measure the impact of data and data visualization on clinical decision making demonstrating an ability to nearly eliminate clinical optimism bias. He then led a team to design a time to next offer model creating a patient-specific supply demand model and patient mortality model to better estimate patient survival in the face of organ refusal to better inform evidence-based medicine. The program proved successful in all 20 transplant centers where the solution was fielded. Nation-wide roll-out began in January 2023 resulting in an estimated 3K additional kidney transplants per year.

US Patent and Trade Office (USPTO). Developed a multi-cloud AI-driven patent search solution in collaboration with Google Patents. The solution provides greater flexibility and custom user experience for patent examiners while benefiting from Google's advanced machine learning models. Designed a human computation experiment demonstrating user interface improvements that increase patent decision discernment, decision confidence and reduced time to decide offering a 14-17% labor savings with improved business outcomes.

US Postal Service (USPS). During the COVID epidemic, the administration declared that they would provide a COVID test kit to every US household. The ordering website only allowed one kit per address, which resulted in over 300K service requests claiming they were wrongfully denied a test kit. McCulloh's team implemented an AI natural language processing solution to categorize service requests enabling instant automated resolution of one third of the requests and then designed a rules-based approach to resolve another third. This enabled the USPS to deliver almost 200M test kits within 24 hours of receipt to meet an unprecedented burden on the USPS.

US Marshalls Service (USMS). During USMS data migration from seven legacy systems to an Amazon data lake, the unique USMS nested data structures exceeded the limits of the Amazon technology. McCulloh collaborated directly with the Amazon VP for public sector, creating a joint Amazon-Accenture team to redesign the Glue Crawler application, involving creation of synthetic data (Amazon was not cleared for data access). He then conducted systematic experimental design to adjust architecture features to improve latency to real-time for required applications ensuring accurate invoicing and ethical prisoner management. He also developed custom analytics to improve workforce planning, optimize prisoner-facility assignment, and implement anomaly detection for compliance checks to improve overall mission success.

Department of State Global Engagement Center (GEC). Revolutionized the analytics and assessment capabilities of the interagency coordinating official for countering disinformation. Stood up a cloud-based analytic platform across 23 NATO nations and 13 US enclaves to facilitate creation of joint analytic products including shared use of data science scripts to increase access to data, improve analytic quality, at reduced time and cost. Elevated the analytic quality and success of programs by introducing social neuroscience, social network analysis, and proper social media analytics, significantly elevating the reputation and success of the GEC across collaborating federal agencies.

Department of Defense U.S. Central Command Data Symposium. Invited to speak to senior defense officials on requirements for implementing artificial intelligence and data solutions at the tactical edge in support of warfighters.

Congressional Hispanic Caucus Institute Tech Summit. Spoke to U.S. congressional leaders on ethics issues for implementing artificial intelligence within government, focused on the benefits to citizens and potential harm from withholding AI solutions.

Defense One invited talk on the human and machine team and the trust variable. Moderated talk with national security and technology subject matter experts on user confidence and trust as essential prerequisites for strong human-machine team performance.

TEDx talk on the “Untapped Potential of Social Networks.” Describes an evolution of research spanning forensics and counter terrorism, through social psychology and organizational behavior, culminating in public health interventions.

<https://www.youtube.com/watch?v=2Hubvs2TiL4>

Deutsch-Amerikanisches Institute Heidelberg *Truth and Disinformation Series*. Invited at the request of the US Embassy in Germany to lecture on disinformation and the neuroscience of persuasion to German audiences and NATO strategic planners.

<https://www.youtube.com/watch?v=8UFAc4LcyOc>

https://www.youtube.com/watch?v=VTr_d9E1DxE

Defense One invited talk on countering extremism with artificial intelligence with Dr. Rebecca Goolsby, Office of Naval Research Program officer.

<https://www.youtube.com/watch?v=AV0j20xnX2o>

SNA STEM Outreach. Created a high school education program to teach social network analysis to disadvantaged high school students to reduce math anxiety, increase the children’s sense of social acceptance and create interest in STEM careers. The program involved students presenting academic posters at a national conference.

Multi National Information Operations Event: Invited by NATO in 2018 to present research for online influence and conduct workshops for social neuroscience and social network analysis.

Social Network Terrain Analysis (SNTA) Software Tool. Developed a custom social network analysis tool for the U.S. Combatting Terrorism Technical Support Office that enables visualization of large networks through a fast clustering algorithm that enables effective zoom at different network resolution. Provides military operational graphics, terms, and symbol overlay to communicate influence planning for online networks.

U.S. Special Operation Social Media Exploitation Pre-Mission Training (PMT). Invited by the U.S. First Special Forces Command to provide a one-week training workshop for soldiers deploying to support Operation INHERENT RESOLVE (conflict in Iraq, Syria, and throughout the Middle East) as a newly formed social media exploitation company.

U.S. Department of Defense (DoD), Directorate of Global Operations. Invited to provide expert testimony in 2018, 2017, and 2016 regarding information warfare and neuroscience on multiple panels presenting to various DoD officials.

Operational Communication in the Digital Age: Invited by the German government to discuss data driven influence at a conference of NATO and German officials. Recognized as a leading expert in this field.

Global Special Operations Symposium: Invited by the Global Special Operations Forces Foundation to speak at their annual conference to discuss future game changing technologies in the area of social neuroscience with over 500 senior leaders in the special operations community from 28 nations. Recognized as a leading expert in this field.

Defense One: <http://www.defenseone.com/technology/2017/03/why-fake-news-spreads-neurological-explanation/136417/>

Tampa Bay Times:

<http://www.tampabay.com/news/military/macdill/symposium/2314231>

NATO Psychological Operations: Invited by US Special Operations Command to speak at the NATO Psychological Operations conference to discuss the future of social media and online, cyber-enabled influence (2016) and Fake news and inoculation (2017). Recognized as a leading expert in this field.

Open Source Intelligence: Invited by the Director, Defense Intelligence Agency (DIA) to open the Defense Open Source Synch conference, which was a senior level meeting of general and flag officers across the US Department of Defense intelligence community. I was asked to identify challenges and opportunities to develop a more effective enterprise solution to open source intelligence, leveraging the latest advances in computer science and cyber technologies. I was the only academic invited to participate in this high-level meeting.

Neuroscience and Radicalization: Invited by the Defense Advanced Research Projects Agency (DARPA) to participate in an expert workshop looking at the process of radicalization and potential contributions that cognitive neuroscience can make to a better understanding of this process.

Engineering Influence in Online Networks: Invited by the US Army Research Office to participate in an expert workshop of hand-picked subject matter experts in the topic of influence in online networks to help them set research priorities and direction for the US Army.

Strategic Multi-Layer Assessment: Provide expert testimony and share research data with members of the Department of Defense Joint Staff for Information Operations and a team of academics advising the military on human culture and social factors affecting military operations, specifically operations against the Islamic State and other violent extremist organizations operating in the Middle East. Organized an exercise for military personnel to evaluate the effectiveness of influence messaging against the Islamic State. The exercise included reformed Islamic State fighters and indigenous populations role-playing adversary and neutral populations in the exercise. These efforts significantly reformed influence activities focused on reducing terrorist recruitment and fund-raising efforts.

Defense One: <http://www.defenseone.com/technology/2016/11/how-special-operators-trained-Psychological-warfare-mosul-fight/133166/>

Population Centric Primary Research: Numerous presentations to US congressional staffers and senior government officials on the application of quantitative social science to understand indigenous populations. Developed methods for conducting research in denied areas such as Syria and occupied Iraq. This research invalidated many defense operational concepts and changed the approach for strategic planning in the Middle East.

Socio-Cyber Terrain: Established a methodology to treat networks of informal relationships, communications, and resource exchange as terrain in an effort to improve military operations.

focused on influence and cyber operations. The U.S. Army has started to incorporate this concept into its current doctrine and training.

Advanced Network Analysis and Targeting (ANAT): Created a methodology to treat forensic data from improvised explosive device (IED) explosions in Afghanistan and Iraq as network data, similar to social networks. By applying social network methods to this data, it is possible to more ethically and effectively target adversary networks using a legally supportable process. Articles featuring these activities can be found at:

National Public Radio: <http://www.npr.org/2010/12/03/131755378/u-s-connects-the-dots-to-catch-roadside-bombers>

Science: http://www.kellogg.northwestern.edu/faculty/uzzi/ftp/media%20hits/Science_Counterterrorism_July09.pdf

Real-World Math: <http://blog.keycurriculum.com/breaking-news-math-nerd-becomes-math-warrior/>

Video Exploitation: Cataloged 2,500 open-source, publicly available videos of insurgents attacking U.S. Forces in Iraq. This represented 74% of all US deaths in Iraq at the time. Developed a network approach to identifying insurgent cells. Unofficial reports estimated that this reduced sniper activity in Iraq by 70%. The impact on IEDs was never estimated. Articles featuring this activity can be found at:

Independent: <http://www.independent.co.uk/news/world/politics/terrorist-facebook-ndash-the-new-weapon-against-al-qaida-1774041.html>

The Telegraph: <http://www.telegraph.co.uk/news/uknews/terrorism-in-the-uk/6053397/Intelligence-agencies-develop-terrorist-Facebook-to-find-links-between-key-players.html>

Huffington Post: http://www.huffingtonpost.com/2009/08/19/terrorist-facebook-intell_n_263140.html

Lead Azide: Lead-Azide is a key ingredient in explosive detonators that the U.S. military stopped producing in 1971. With the Global War on Terror, the U.S. Military needed to produce this chemical again in an environmentally friendly way, before the stockpile ran out. The old process could not be replicated and research efforts to re-discover the “recipe” were estimated to take 14 years. I developed a statistically designed experiment, conducted a response surface analysis to reach an environmentally safe solution in 4 months.

Sensitive Equipment Decontamination: Used response surface methods to design, analyze, and optimize the process time of the modified Vaporized Hydrogen Peroxide (mVHP) sensitive equipment decontamination system, to make it suitable for Army thorough decontamination. This allowed the military to pursue one joint acquisition system as opposed to two, saving DoD millions of dollars

Overtime Viewer (Software): Wrote a software application to conduct longitudinal analysis of network data and detect statistically significant changes over time. This software tool was integrated within the Organizational Risk Analyzer (ORA) produced by Carnegie Mellon University and widely used throughout the Department of Defense, Industry, and academia.

CURRICULUM VITAE

IAN MCCULLOH

PART II

TEACHING

Advisees

Hasala Peiris, Ph.D. Information Systems, FEB 2015, Curtin University
Thesis: A Socio-Technical Security Risk Assessment Methodology for Information Systems Access

McKneely, Jennifer, D.Eng, MAY 2021, Johns Hopkins University

Potter, Timothy, M.S. Computer Science, DEC 2017, Johns Hopkins University
Thesis: Understanding Vaping Norms Through Exploration of Social Media

Helen Armstrong, M.S. Information Systems, JUN 2013, Curtin University
Thesis: Assessing Organizational Risk Using Meta-Network Analysis

Jan, Johanna, M.S. Computer Science, DEC 2018, Johns Hopkins University

Sowa, Christine, M.S. Computer Science, AUG 2018, Johns Hopkins University
Thesis: Monitor demographic trends in low/middle income countries w/ m. phone data

Raymond McGowan, M.S. Systems Engr, DEC 2018, Johns Hopkins
Thesis: "Needs Analysis to Inform the Civil Information Requirements" – In progress

Stephan Bren, M.S. Systems Engr, AUG 2019 (Est), Johns Hopkins
Thesis: "Application of Systems Engineering Methods to a Deployed SharePoint System"

Larry Whitlock, M.S. Systems Engr, AUG 2019 (Est), Johns Hopkins
Thesis: "Manpower Analysis in Defense Contracting"

Graduate Committee Membership

Robert Behrman, Ph.D. Public Policy, MAY 2014, Carnegie Mellon University
Thesis: Structural Assessment of Military Organizational Capability

Robert Schotter, M.S. Defense Analysis, MAY 2015, Naval Postgraduate School
Thesis: Bridging the Gap: Enhancing SNA within the Marine Corps Intelligence Community

Rhada Rajan, D.P.H. MAY 2018, Johns Hopkins University
Thesis: Engagement in Digital Behavior Change Interventions

Cory Bradley, D.P.H., MAY 2019, Johns Hopkins University
Thesis: Impact of Loneliness on High Risk Sexual Behavior in BMSM populations

Divya Mishra, M.D./Ph.D., MAY 2019, Johns Hopkins University
Thesis: Access to health care for adolescent refugee populations in Europe

Classroom Instruction – 164 university courses teaching 2,345 students

Johns Hopkins University (June 2015 – Present, 76 courses, 1,036 students)

410.733 Comm. Network Analysis in Public Health Programs (24 stud, Fall 2016)
410.733 Comm. Network Analysis in Public Health Programs (21 stud, Fall 2017)
410.733 Comm. Network Analysis in Public Health Programs (18 stud Fall 2018)
625.240 Introduction to Probability and Statistics (22 students Spring 2021)

625.240 Introduction to Probability and Statistics (21 students Fall 2021)
 625.240 Introduction to Probability and Statistics (19 students Spring 2022)
 625.240 Introduction to Probability and Statistics (24 students Fall 2022)
 625.240 Introduction to Probability and Statistics (10 students Spring 2023)
 625.240 Introduction to Probability and Statistics (37 students Fall 2023)
 625.240 Introduction to Probability and Statistics (34 students Spring 2024)
 625.240 Introduction to Probability and Statistics (19 students Summer 2024)
 625.240 Introduction to Probability and Statistics (39 students Fall 2024)
 625.240 Introduction to Probability and Statistics (43 students Spring 2025)
 625.240 Introduction to Probability and Statistics (30 students Summer 2025)
 625.240 Introduction to Probability and Statistics (44 students Fall 2025)
 625.240 Introduction to Probability and Statistics (37 students Spring 2026)
 625.603 Statistical Methods and Data Analysis (15 students Fall 2025)
 605.433 Social Media Analytics (7 graduate students, Fall 2015)
 605.433 Social Media Analysis (16 graduate students Fall 2016)
 605.433 Social Media Analysis (13 graduate students Spring 2017)
 605.433 Social Media Analysis (14 graduate students Fall 2017)
 605.433 Social Media Analysis (15 graduate students Spring 2018)
 605.433 Social Media Analysis (15 graduate students Spring 2018)
 605.434 Crowdsourcing and Human Computation (6 grad students Spring 2018)
 645.421 Engineering and Measuring Influence (5 grad students Fall 2018)
 645.421 Engineering and Measuring Influence (9 grad students Fall 2019)
 645.421 Engineering and Measuring Influence (6 grad students Spring 2020)
 645.421 Engineering and Measuring Influence (10 grad students Fall 2020)
 645.421 Engineering and Measuring Influence (13 grad students Spring 2021)
 645.421 Engineering and Measuring Influence (17 grad students Spring 2022)
 645.421 Engineering and Measuring Influence (6 grad students Fall 2022)
 645.421 Engineering and Measuring Influence (8 grad students Spring 2023)
 645.421 Engineering and Measuring Influence (11 grad students Fall 2023)
 645.421 Engineering and Measuring Influence (9 grad students Spring 2025)
 645.421 Engineering and Measuring Influence (6 grad students Spring 2026)
 605.631 Statistical Methods for Computer Science (14 grad students Fall 2018)
 605.631.81 Statistical Methods for Computer Science (12 grad students Fall 2019)
 605.631.82 Statistical Methods for Computer Science (8 grad students Fall 2019)
 605.631 Statistical Methods for Computer Science (15 grad students Spring 2020)
 605.631 Statistical Methods for Computer Science (15 grad students Fall 2020)
 605.631 Statistical Methods for Computer Science (12 grad students Spring 2021)
 605.631 Statistical Methods for Computer Science (17 grad students Fall 2021)
 605.631 Statistical Methods for Computer Science (13 grad students Spring 2022)
 605.631 Statistical Methods for Computer Science (16 grad students Fall 2022)
 605.631 Statistical Methods for Computer Science (6 grad students Spring 2023)
 605.631 Statistical Methods for Computer Science (5 grad students Fall 2023)
 605.631 Statistical Methods for Computer Science (5 grad students Spring 2024)
 605.631 Statistical Methods for Computer Science (5 grad students Spring 2025)
 605.631 Statistical Methods for Computer Science (4 grad students Fall 2025)
 605.631 Statistical Methods for Computer Science (5 grad students Spring 2026)

605.633.81 Social Media Analysis (19 grad students Fall 2018)
 605.633.82 Social Media Analysis (17 grad students Fall 2018)
 605.633 Social Media Analysis (18 grad students Spring 2019)
 605.633 Social Media Analysis (9 grad students Fall 2019)
 605.633 Social Media Analysis (11 grad students Fall 2020)
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 605.633 Social Media Analysis (6 grad students Spring 2022)
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 605.633 Social Media Analysis (6 grad students Fall 2024)
 605.633 Social Media Analysis (10 grad students Spring 2025)
 605.633 Social Media Analysis (15 grad students Fall 2025)
 605.633 Social Media Analysis (10 grad students Spring 2026)
 605.634 Crowdsourcing and Human Computation (6 grad students Fall 2022)
 605.634 Crowdsourcing and Human Computation (3 grad students Fall 2023)
 605.634 Crowdsourcing and Human Computation (3 grad students Spring 2024)
 605.634 Crowdsourcing and Human Computation (5 grad students Fall 2024)
 605.634 Crowdsourcing and Human Computation (5 grad students Fall 2025)
 605.634 Crowdsourcing and Human Computation (11 grad students Spring 2026)
 705.608.81 Applied Generative AI (16 grad students Summer 2025)
 705.608.82 Applied Generative AI (14 grad students Summer 2025)
 705.608.81 Applied Generative AI (16 grad students Fall 2025)
 705.608.82 Applied Generative AI (17 grad students Fall 2025)
 705.608.81 Applied Generative AI (19 grad students Spring 2026)
 705.608.82 Applied Generative AI (19 grad students Spring 2026)
 705.608.83 Applied Generative AI (10 grad students Spring 2026)
 705.615 AI for Leaders (16 grad students Fall 2024)
 705.615.81 AI for Leaders (19 grad students Spring 2025)
 705.615.82 AI for Leaders (16 grad students Spring 2025)
 705.615.83 AI for Leaders (7 grad students Spring 2025)
 705.615 AI for Leaders (18 grad students Summer 2025)
 705.615.81 AI for Leaders (18 grad students Fall 2025)
 705.615.82 AI for Leaders (17 grad students Fall 2025)
 705.615 AI for Leaders (18 grad students Spring 2026)
 705.617 AI in Healthcare (17 grad students Fall 2025)
 705.617 AI in Healthcare (18 grad students Spring 2026)
 Primary advisor to six master's degree students.
 Co-advisor to four doctoral students.
Curtin University of Technology (Sept 2009 – Jan 2015, 3 courses, 40 students)
 IS601 Network Analysis for Organizational Risk (28 graduate students)
 IS603 Advanced Network Analysis (7/5 graduate students)
 Primary advisor to one Ph.D. student.
 Primary advisor to one master's degree student.

West Point (June 2004 – May 2011, 48 courses, 720 students)

- PL100 General Psychology
- PL385 Org Systems Theory and Design (Course Director)
- PL397 Topics in Sociology (Course Director)
- PL470 Social Network Analysis (Course Director)
- PL488C Management Consulting (Course Director)
- PL498 Mathematical Sociology (Course Director)
- PL498 Research Seminar in Behavioral Sciences I
- PL499 Research Seminar in Behavioral Sciences II
- MG420 Operations Management
- MA103 Modeling and Analysis
- MA104 Differential Calculus
- MA206 Probability and Statistics
- MA376 Applied Statistics (Course Director)
- MA391 Mathematical Modeling (taught a three-week block within the course)
- MA488 Response Surface Optimization (Course Director)
- MA489 Advanced Network Analysis (Course Director)
- MA491 Research Seminar in Mathematics
- MA498 Mathematics Honors Thesis I
- MA499 Mathematics Honors Thesis II

University of Maryland Baltimore City (Baghdad, Iraq) (Sept – Dec 2010, 2 courses, 31 stu)

- MATH 103 Mathematical Thinking

Central Texas College (Baghdad, Iraq) (September 2010 – January 2011 2 courses, 12 stud)

- MTMS 1273 Fundamentals of Leadership
- MTMS 1174 Terrorism in the Middle East

Saint Thomas Aquinas College (January 2006 – April 2010, 16 courses, 195 students)

- CIS101 Introduction to Computers
- CIS211 Software Topics: Programming in PERL
- MATH101 College Algebra
- MATH120 Statistics
- PSYC310 Statistical Methods in Psychology
- PSYC409 Experimental Psychology
- SCI 101 Development of Science
- SOC205 Social Problems
- SOC206 Violence in America
- SOC300 Social Network Analysis

Mount Saint Mary's College (August 2005 – December 2009, 5 courses, 48 students)

- CMA2170 Public Speaking
- MTH1100 Elementary Functions
- MTH2070 Elementary Statistics

Executive and Professional Education - Online Certificate Programs

Johns Hopkins University (5 courses, 5,463 students)

- AI Business Strategy October 2024 – 50 students
- AI Business Strategy December 2024 – 77 students
- AI Business Strategy January 2025 – 108 students

AI Business Strategy February 2025 – 74 students
 AI Business Strategy March 2025 – 82 students
 AI Business Strategy April 2025 – 72 students
 AI Business Strategy May 2025 – 85 students
 AI Business Strategy June 2025 – 80 students
 AI Business Strategy July 2025 – 91 students
 AI Business Strategy August 2025 – 87 students
 AI Business Strategy September 2025 – 120 students
 AI Business Strategy October 2025 – 78 students
 AI Business Strategy November 2025 – 77 students
 AI Business Strategy December 2025 – 37 students
 AI Business Strategy January 2026 – 80 students
 Applied Generative AI January 2025 – 65 students
 Applied Generative AI February 2025 – 101 students
 Applied Generative AI March 2025 – 151 students
 Applied Generative AI April 2025 – 150 students
 Applied Generative AI May 2025 – 168 students
 Applied Generative AI June 2025 – 160 students
 Applied Generative AI July 2025 – 200 students
 Applied Generative AI August 2025 – 181 students
 Applied Generative AI September 2025 – 276 students
 Applied Generative AI October 2025 – 196 students
 Applied Generative AI November 2025 – 188 students
 Applied Generative AI December 2025 – 76 students
 Applied Generative AI January 2026 – 120 students
 AI in Healthcare June 2025 – 77 students
 AI in Healthcare July 2025 – 95 students
 AI in Healthcare August 2025 – 206 students
 AI in Healthcare September 2025 – 215 students
 AI in Healthcare October 2025 – 164 students
 AI in Healthcare November 2025 – 176 students
 AI in Healthcare December 2025 – 141 students
 AI in Healthcare January 2026 – 120 students
 Agentic AI September 2025 – 200 students
 Agentic AI October 2025 – 169 students
 Agentic AI November 2025 – 165 students
 Agentic AI December 2025 – 145 students
 Agentic AI January 2026 – 200 students
 Applied AI October 2025 – 33 students
 Applied AI December 2025 – 38 students
 Applied AI January 2026 – 40 students
 Gen. AI & Agents Fund's October 2025 – 26 students
 Gen. AI & Agents Fund's January 2026 – 20 students

Executive and Professional Education – In-Person/Hybrid Certificate Programs
Johns Hopkins University (5 courses, 5,463 students)

AI for Credit Union Executives & Senior Leaders November 2025
AI for Credit Union Executives & Senior Leaders February 2025
AI for Credit Union Executives & Senior Leaders November 2024
National Cryptographic University AI Strategy May 2025
National Cryptographic University Gen AI Practitioner June 2025
National Cryptographic University AI Strategy July 2025
National Cryptographic University Gen AI Practitioner August 2025
USTRANSCOM AI for Senior Leaders July 2025
USTRANSCOM AI for Senior Leaders October 2025

U.S. Military Academy at West Point

In 2009, deployed to Afghanistan at the request of former students to develop and deliver a warfighter-focused social network analysis curriculum for counterinsurgency targeting. Designed PL470 Social Network Analysis (West Point) and the operational course Advanced Network Analysis and Targeting (ANAT), delivered in Afghanistan and Iraq; in May 2010, was by-name requested to lead the Counter-IED Operations Integration Center (COIC) in Iraq while teaching ANAT. ANAT later became a standing Army pre-deployment course for deploying brigades.

<https://community.apan.org/wg/tradoc-g2/operational-environment-and-threat-analysis-directorate/w/red-diamond-newsletters/31504/02-tradoc-s-network-engagement-team-a-focus-on-network-data-and-cognitive-maneuver-training/>

I have overseen ANAT, taught as an intensive college level course, at the following locations:

ANAT 10-01 Jan 10 Bagram, Afghanistan (course director and instructor)
ANAT 10-02 Feb 10 Baghdad, Iraq (course director)
ANAT 10-03 Feb 10 Baghdad, Iraq (course director)
ANAT 10-04 Mar 10 Newport News, VA (course director)
ANAT 10-05 May 10 Basrah, Iraq (course director)
ANAT 10-06 May 10 Camp Speicher, Iraq (course director and instructor)
ANAT 10-07 Jun 10 Baghdad, Iraq (course director)
ANAT 10-08 Aug 10 Baghdad, Iraq (course director and instructor)
ANAT 10-09 Sep 10 Basrah, Iraq (course director and instructor)
ANAT 10-10 Sep 10 Fort Huachuca, AZ (course director)
ANAT 10-11 Sep 10 Honolulu, HI (course director)
ANAT 10-12 Sep 10 Schofield Barracks, HI (course director)
ANAT 10-13 Oct 10 Fort Lewis, WA (course director)
ANAT 10-14 Oct 10 Joint Base Balad, Iraq (course director)
ANAT 10-15 Oct 10 Fort Bragg, NC (course director and instructor)
ANAT 10-16 Nov 10 Camp Speicher, Iraq (course director and instructor)
Iraqi ANAT Dec 10 Rusaffa, Iraq (course taught in Arabic, course dir/ instr)
ANAT 12-01 Apr 12 Tampa, FL (course director and instructor)
ANAT 13-01 Jan 13 Kabul, Afghanistan (course director and instructor)

RESEARCH GRANT PARTICIPATION (\$33,498,043 as PI)

“Intelligent Generation of Tools for Security (INGOTS)”, 2024-7, DARPA
PI: Ian McCulloh, ~\$4M (under negotiation)

Objective: Deliver a novel approach for data consolidation and integration using formal methods and mathematical category theory to create a consolidated database of cyber vulnerabilities and proofs of vulnerability for improved machine learning.

“Resilient Supply-Demand Networks (RSDN)”, 2022-4, DARPA

PI: Ian McCulloh, \$6,381,413

Objective: Procure, curate, and expose commercial and government RSDN data to develop custom network/graph-based data models to enable improved modeling of dynamic disruptions and supply chain resilience.

“Online Network Scale-Up Method”, 2022, National Science Foundation (NSF)

PI: Ian McCulloh, \$600K

Objective: Develop an online deployment of network scale-up method survey for estimating the size of hard-to-count populations and validating against federal administrative and alternate survey data to create a low cost, low burden survey alternative.

“SemaFor” 2020-2022, DARPA

PI: Marc Bosch and Ian McCulloh, \$1.2M

Objective: Develop, document, and implement adversarial AI tactics and methods to test deep fake detection technology developed in the DARPA SemaFor program.

“How consumers use flavors to make inferences about Electronic Nicotine Delivery System (ENDS) product qualities and intentions to use” 2018-2021, FDA

PI: Meghan Moran, Ryan Kennedy, Lisa Lagasse, Ian McCulloh, \$200K

Objective: Examine how flavors are portrayed in e-cigarette advertisement and their influence on consumers using neuroscience methods to include functional near infrared spectroscopy of the brain, eye-tracking, and survey research.

“Crowd Health” 2018-2021, National Institute of Health {*nominated for most innovative*}

PI: Cui Yang and Ian McCulloh, \$150K

Objective: Develop and validate methodology to crowd-source influence campaigns and assess effectiveness using functional near infrared spectroscopy of the brain.

“Software Archeology” 2018-2020, U.S. Department of Defense MINERVA

PI: Ian McCulloh and Matthew Elder, \$1,643,511

Objective: Model social networks of software developers based on patterns within the binaries of malicious code.

“Exploring Majority Illusion and Pluralistic Ignorance within the Context of Eastern European Social Media” 2018, Office of Naval Research

PI: Ian McCulloh and John Skvoretz, \$196K

Objective: Model and investigate majority illusion and pluralistic ignorance within online social networks in Eastern Europe.

“Research Analytics Cell,” 2017, 1st Special Forces Command, Ft. Bragg, NC

PI: Ian McCulloh, \$2.6M

Objective: Develop a capability for U.S. special operations to acquire online publicly available information and apply analytic workflows to conduct target audience analysis and assess the effectiveness of online influence campaigns. This project includes physical engineering of the technical solution, as well as personnel training and workflow development.

“Advanced Open Source Intelligence Course,” 2017, Marine Corps Intelligence Activity.

PI: Ian McCulloh, \$400K

Objective: Develop curriculum to teach data science to intelligence professionals in the U.S. Marine Corps to improve their ability to conduct meaningful analysis of publicly available information. Content must include social network analysis, text analytics, image classification, and managed attribution.

“Monitoring Demographic Trends in Low- and Middle-Income Countries (LMIC) from Mobile Phone Metadata,” 2017, Johns Hopkins University Discovery Grant.

PI: Ian McCulloh and Stephane Helleringer, \$150K

Objective: Investigate whether metadata extracted from mobile phone records can be used to monitor demographic trends in LMICs at highly disaggregated spatial scales (e.g., administrative districts).

“Open Source Collection Analysis and Requirements (OSCAR) Assessment,” 2017 Defense Intelligence Agency (DIA).

PI: Ian McCulloh, \$200K

Objective: Conduct an objective systems level assessment of the DIA managed OSCAR system for meeting intelligence community open source requirements. Provide recommendations for system level improvements.

“Support for the United States Marine Corps Open Source Intelligence and Information Operations Efforts,” 2017, Office of Naval Research

PI: Ian McCulloh, \$75K

Objective: Combine existing theories of online factions into an empirically supported theory of integrated online-offline social mobilization, activism, and political violence.

“Large Scale Network Analysis Accelerated by Graphical Processing Unit (GPU),” 2017 Johns Hopkins Applied Physics Lab Internal

PI: Ian McCulloh, \$50K

Objective: Implement limited graph analytics on a GPU to increase size and speed of network calculations to support lab developed SNA software packages.

“North American Social Network (NASN) Conference,” 2017, Army Research Office

PI: Ian McCulloh, \$15,123

Objective: Generous grant in support of organizing the first North American regional conference of the International Network for Social Network Analysts (INSNA), which is the academic professional society for social network analysis.

“Online Preparation of the Environment,” 2017, U.S. Army Cyber Command

PI: Ian McCulloh, \$5.7M

Objective: Mixture of classified and unclassified research to understand influence propagation over social media. Develop and validate methods to counter adversary propaganda through social media.

“Gold Standard Data Set,” 2017, U.S. Special Operations Command

PI: Ian McCulloh, \$1.3M

Objective: Develop a gold standard data set of annotated automated message handling (AMH) documents, which consist of official communications ranging from intelligence documents to Embassy cables, using a novel annotation ontology. This data will be used to develop and evaluate advanced machine learning analytics for intelligence discovery.

“Social Media Firestorms,” 2016 Johns Hopkins Applied Physics Lab Internal

PI: Ian McCulloh and David Silberberg, \$200,000

Objective: Develop a computational approach to identify and classify large negative word-of-mouth (firestorms) on Twitter using a grounded theory approach from political science and social network diffusion theory.

“fNIRS Jordan,” 2016, US Air Force Office of Scientific Research

PI: Ian McCulloh, \$186,268

Objective: Investigate the efficacy of using functional near infrared spectroscopy to measure neural markers (brain activity) associated with influence while subjects respond to public health public service announcements (PSA) in Amman Jordan.

“Cyber Transition to Practice,” 2016, US Cyber Command

PI: Ian McCulloh and LTC Stoney Trent, \$500,000

Objective: Evaluate the whole of system performance of two command and control systems for the US Cyber Mission Force. The approach leverages human factors engineering and statistical design of experiments.

“Deployable Mission Support System,” 2016, US Cyber Command

PI: Ian McCulloh, \$2,000,000

Objective: Conduct statistical design of experiments to test and evaluate the performance of candidate hardware and software tools for the US Cyber Mission Force from both a technical and human performance perspective.

“Characterization of Open Resources for Planning and Understanding Strategies (CORPUS),” US Engineering Research and Development Center

PI: Ian McCulloh and Bruce McQueery, \$150,000

Objective: Extend innovative advanced text analytics and machine learning to analyze open source intelligence (OSINT) to understand the implications of socio-cultural beliefs values, and interest on mission preparation, planning and execution.

“Special Operations Environmental Analysis,” 2016, Special Operations Command Central

PI: Ian McCulloh, \$850,000

Objective: Design a process with accompanying tools to conduct online influence and operational preparation of the environment in support of special operations objectives in the Middle East and Central Asia. Develop an operational assessment to measure the effectiveness of the process and create a training program to build capacity within the military sponsor organization.

“Social (Network) Terrain Mapping and IPB,” 2016, Combatting Terrorism Technical Support Office

PI: Ian McCulloh, \$850,000

Objective: Develop and Ozone Widget Framework (OWF) application for social network analysis for use with social media to enhance understanding of the information environment. Develop training to accompany the software widget.

“Socio-Cyber Terrain,” 2015-present, U.S. Army Research Lab, Adelphi, MD.

PI: Ian McCulloh, \$1,400,000

Objective: Basic and applied multi-disciplinary research on using social network representations to map key cyber terrain for situational awareness, influence and cyber access planning. Conduct cyber ethnography to develop an appropriate conceptual bridge between traditional maneuver and cyber operations. Review network analysis packages in the R programming language to support the Army’s data science community.

“Maneuver and Engagement in the Narrative Space,” 2015, US TRADOC, Ft Meade

PI: Ian McCulloh, \$107,000

Objective: Develop Army doctrine to apply neuroscience, social psychology, and media communications research to inform military engagement in asymmetric or gray-zone conflicts.

“Network Reference Point,” 2015, Johns Hopkins Applied Physics Lab Internal

PI: Ian McCulloh, \$86,000

Objective: Applied research to develop methods to scrape data and assemble multiple social media networks surrounding the same population.

“Post Traumatic Stress Disorder,” 2010-11, Walter Reed Army Institute of Research

PI: Ian McCulloh and Michael Matthews, \$1,000,000

Objective: Basic research on social psychological and social network factors affecting post traumatic stress disorder (PTSD), depression, and suicide.

“Longitudinal network analysis, network change detection, and ergodicity.” 2009-11

US Army Research Organization, Triangle Park, NC

PI: Ian McCulloh, Anthony Johnson, David Arney, \$418,000

Objective: Basic research to explore methods of statistical change detection, given highly dependent, non-linear data, commonly found in network applications.

“IkeNet 3,” 2008-11, US Army Research Institute for the Behavioral Sciences

PI: Ian McCulloh, \$450,000

Objective: Investigate friendship formation, group dynamics and distributed communication, using social network analysis to study blackberry and email communication among faculty and cadets at the US Military Academy at West Point.

“IkeNet 2,” 2007-8, US Army Research Institute for the Behavioral Sciences

PI: Ian McCulloh, \$100,000

Objective: Investigate distributed communication, using social network analysis to study blackberry and email communication among graduate students at Columbia Univ.

“ELICIT Net,” 2007-8, Asst Secretary of Defense for Networks and Integration

PI: Ian McCulloh, \$350,000

Objective: Investigate methods for distributed communications to elicit organizational efficiency in military organizations.

“NetSci 2008,” 2008, US Army Research Institute for the Behavioral Sciences

PI: Ian McCulloh, \$24,000

Objective: Co-sponsor NetSci 2008 conference in Vicenza, Italy. My research was focused on detecting changes in networks over time.

“Language Instant Screening Tool (LIST),” 2007, US Army Research Lab

PI: Ian McCulloh, \$3,500.

Objective: Developed a device that takes a digital picture of an Arabic document and then applies machine language translation followed by semantic network analysis to determine the theme of the document.

“Summer Workshop on Statistical Analysis of Social Networks,” 2007, US Army Research Institute for the Behavioral Sciences

PI: Ian McCulloh, \$18,130

Objective: Hosted a summer workshop to train students, faculty, and government researchers in statistical methods used in social network analysis.

“IkeNet,” 2006-7, US Army Research Institute for the Behavioral Sciences

PI: Ian McCulloh, \$128,000

Objective: Collect social network data on a group of 24 Army officers enrolled in a one year graduate program at Columbia University. Investigate the data for statistically significant factors causing connections and cliques in the network using mixed methods.

“Sensitive Equipment Decontamination (SED),” 2006-7, Edgewood Chemical and Biological Center

PI: Ian McCulloh, \$17,000

Objective: Use response surface methods to design, analyze, and optimize the process time of the modified Vaporized Hydrogen Peroxide (mVHP) sensitive equipment decontamination system, to make it suitable for Army thorough decontamination. This will allow the JPEO-CB to pursue one joint acquisition system as opposed to two, saving DoD millions of dollars.

“Efficient Decontamination,” 2005-6, Joint Program Executive Office Chem-Bio

PI: Ian McCulloh, \$20,000

Objective: Evaluate alternative materiel solutions to chemical and biological decontamination using discrete event simulation.

ACADEMIC SERVICE

Executive and Professional Education, Whiting School of Engineering, Johns Hopkins University

Engineering for Professionals Program, Whiting School of Engineering, Johns Hopkins University (Programs: AI, Computer Science, Cybersecurity, Data Science, Information Systems Engineering, Robotics, Systems Engineering)

Health Behavior and Society, Bloomberg School of Public Health, Johns Hopkins University

School of Information Systems, Business School, Curtin University

Departments of Mathematical Sciences, Behavioral Sciences and Leadership, Civil and Mechanical Engineering, U.S. Military Academy (West Point)

Department of Liberal Arts & Science, University of Maryland Baltimore County
Baghdad, Iraq Extension Campus, Central Texas College

College of Liberal Arts & Science, Saint Thomas Aquinas College

College of Liberal Arts & Science, Mount Saint Mary College