

Daniel C. McFarlane, Sc.D.

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Safety-Critical Artificial Intelligence (AI) Systems

SUMMARY

A proven science and innovation leader focused on the creation of safety-critical artificial intelligence (AI) systems to empower and protect essential workers and the people they serve. Applications: healthcare, public health, and national security. Career highlights: 13 sponsor organizations; 32 funded contract research and development (CR&D) projects (18 as overall lead); \$140M CR&D total funding (51% as overall lead); \$8.5B IDIQ Lead Technology Approach writer; led and manage research teams up to 45 professionals; 35 formal peer-reviewed publications; 10 patent, or patent-pending inventions; and 11 trade secret innovations; with 6 transitioned into fielded safety-critical products.

CORE COMPETENCIES

Foundational science of alarm safety	Principal investigator (PI), program manager (PM)
Breakthrough science on human infection	Technology transition into key products
Wearables for biotelemetry and decision-aiding	Leading large cross-organizational R&D teams
AI/ML algorithms and real-time architectures	Analysis and ideation for safety-critical activities
Big data science and visualization	Intellectual property, contracts, data privacy
Cognitive systems for decision-support	Proposal writing and capture management
Physiological and environmental health monitoring	Clinical trials & human-subjects experiments

PROFESSIONAL EXPERIENCE

TREFOIL INCORPORATED, A Skunkwork-style private digital innovation lab, Salt Lake City, UT

Founder & CEO (3 years), Jul. 2023 – present

Define, organize, provision, and lead innovation projects to solve important safety-critical problems with “new-to-the-world” disruptive AI innovations for important safety-critical problems.

PHILIPS, Philips Research North America, Connected Care & Personal Health, Cambridge, MA

Group Leader & Principal Scientist (3.5 years), Jan. 2020 – Jun. 2023

Led multi-organization teams (3-42) applied informatics R&D to improve healthcare and patient safety. Managed research group (13 PhD's). Identified opportunities, secured funding to create high-value innovation and intellectual property, coordinated across businesses to improve core products.

- Overall lead for the \$75M RATE portfolio (Rapid Analysis of Threat Exposure) of US Department of Defense (DoD) investments (DTRA/DIU/DARPA/AFRL/JPEO) in predictive monitoring to improve military force readiness through pre-symptomatic early warning of exposure to infectious agents and hazardous chemicals. Projects: RATE-COVID, PREP, NOTE, RATE-Ship, RATE-Tracker, RATE-Smartabase, RATE-Activate [note, I left after winning RATE Activate]. Partners include: Texas A&M U., VA Hospital (Palo Alto, CA), PAVIR, Dexcom Inc., and MCG at Augusta U.

- MESH (DTRA, \$400K), explored novel technologies for contactless physiological monitoring at >100 meters; PM, and technical advisor to PI, Sara Mariani; Partners include: Charles River Analytics (CRA);

PHILIPS, Philips Research North America, Acute Care Solutions, Cambridge, MA

Principal Scientist (1.7 years), May 2018 – Dec. 2019

Led multi-organization teams (3-42) applied informatics R&D to improve healthcare and patient safety. Identified opportunities, secured funding, coordinated across businesses to improve core products.

- Highlight: Sensor Bar, healthcare environmental monitor and edge-compute platform innovation (inventor/PI). Deployed 1.5y with the LOTUS clinical experiment in two US hospital NICUs, 51 beds.
- Other projects: RATE (DIU/DTRA, \$1.8M);

PHILIPS, Patient Care & Monitoring Solutions (PCMS) / Monitoring Analytics & Therapeutic Care (MA&TC), CMIO Office, Clinical Science & Innovation, Andover, MA

Principal Research Scientist (4.1 years), Apr. 2014 – May 2018

Led or contributed to multi-organization teams (3-20) in applied informatics R&D to improve healthcare and patient safety. Identified opportunities, coordinated across businesses to improve core products.

- Highlight: Contextual Delivery of Medical Alarms (CDMA) CR&D (US OASD(R&E), \$650K), wearable metacognitive aid for nurse triage of alarms, PM/PI;
- Other projects: Wearable surveillance RCC; AAMI HTSI Alarm Safety Steering; Aug. Environment;

LOCKHEED MARTIN ADVANCED TECHNOLOGY LABS, Informatics Lab, Arlington, VA

LM Fellow and Principal Research Engineer (4.3 years), Jan. 2010 – Apr. 2014

Led or contributed to multi-organization teams (3-45) to improve the competitiveness of LM core products for US military command and control and national security. Identified needs, secured funding.

- Highlight: JOIN: Mixed-Initiative Discovery in Big-Data (LM, \$450K), flexible big data analytics, PI/PM;
- Other projects: LM Fellows AT-TT; ATTEND Innovation Process; INSIGHT (DARPA, \$11M); SUMMIT (ONR \$5M); CASI (LM, \$1.3M); NETCENTS-2 IDIQ Proposal (USAF, \$1B+\$7.5B)

LOCKHEED MARTIN ADVANCED TECHNOLOGY LABS, Artificial Intelligence Lab, Camden & Cherry Hill, NJ

Principal Member Engineering Staff (4.3 years), Sep. 2005 – Jan. 2010

Senior Member Engineering Staff (5.6 years), January 2000 – September 2005

Led or contributed to multi-organization teams (3-35) in applied AI R&D to solve US military command and control shortfalls. Identified opportunities, secured funding, and improved national security.

- Highlight: Human Alerting and Interruption Logistics – Surface Ship (ONR FNC \$3.5M), Aegis WS, PI/PM;
- Other projects: Suspicion Vessel Focuser (DARPA, LM, \$1.2M); Integrated Learning (DARPA, \$20M); FastC2AP (DARPA, \$5M); Inter. Dirt (LM, \$35K); IE Arch. (LM, \$250K); IBC (DARPA \$3M); AugCog (DARPA, \$5.5M); DDG-1000 SRM (\$1.2M); Composable C2 (LM, \$150K); JAGUAR (DARPA, \$8M).

US NAVAL RESEARCH LAB, Navy Center for Applied Research in Artificial Intelligence, Washington., DC

Lead Research Scientist & Thomas Edison Fellow (4.3 years), Oct. 1995 – Jan. 2000

Research Scientist (5.2 years), Aug. 1990 – Oct. 1995

Led teams or contributed to (2-3) in applied AI R&D to solve US Navy command and control future capability shortfalls. Worked across multiple organizations to shape S&T investments.

- Highlight: Human Alerting and Interruption Logistics (HAIL), foundational, interdisciplinary basic research on human interruption for human-AI-systems integration (ONR and NRL), PI/PM;
- Other projects: Integrality & Separability of Input Dev. (ONR, NRL); Hierarchical Interactive Case-Based Arch. (ONR, NRL, ARL); METOC Decision-Support (NRL); ISART (ONR, NRL); Auto. Soft. Verif. (ONR, NRL)

EDUCATION

George Washington University, Washington, DC

Sc.D. (1998), Computer Science; Emphasis: Computer Graphics and Multimedia Systems

University of Oregon, Eugene, OR

M.S. (1990), Computer Science; Emphasis: Artificial Intelligence

Cornell University, Ithaca, NY

B.S. (1987, Honors and Distinction), Communications; Emphasis: Interpersonal Communications

PUBLICATIONS (RECENT SAMPLE)

- Feng, Ting, Mariani, Sara, Conroy, Bryan, Damiano, Robert, Silva, Ikaro, Swearingen, Dennis, McFarlane, Daniel C. (2025) An infection prediction model developed from inpatient data can predict out-of-hospital COVID-19 infections from wearable data when controlled for dataset shift, *Sci Rep* 15, 33367 (2025). <https://doi.org/10.1038/s41598-025-17593-y>
- Wang, Chunxue, Mariani, Sara, Damiano, Robert J., Lajevardi-Khosh, Arad, Silva, Ikaro, Ruebush, Laura, McFarlane, Daniel C., Deutz, Nicolaas, Conroy, Bryan. (2025). Wearable-derived short sleep duration is associated with higher C-reactive protein in a placebo-controlled vaccine trial among young adults. *Sci Rep* 15, 10501 (2025). 10.1038/s41598-025-94816-2.
- Wang, Chunxue, Damiano, Robert J., Ruebush, Laura E., Engelen, Mariëlle P. K. J., Mariani, Sara, Liu, luoluo Borhani, Soheil, Cote, Gerard L., McFarlane, Daniel C., Deutz, Nicolaas E. P. (2024) A randomized, triple-blinded, placebo-controlled clinical trial evaluating immune responses of Typhim Vi and PPSV23 vaccines in healthy adults: the PREP study, *Vaccine* 42(26):126292, DOI:10.1016/j.vaccine.2024.126292.
- Feng, Ting, Noren, David P., Kulkarni, Chaitanya, Mariani, Sara, Zhao, Claire, Ghosh, Erina, Swearingen, Dennis, Frassica, Joseph, McFarlane, Daniel, and Conroy, Bryan, (2023) Machine learning-based clinical decision support for infection risk prediction. *Front. Med.* 10:1213411, *Sec. Precision Medicine*, Volume 10 – 2023, <https://doi.org/10.3389/fmed.2023.1213411>
- Conroy, B., Silva, I., Mehraei, G., Damiano, R., Gross, B., Salvati, E., Feng, T., Schneider, J., Olson, N., Rizzo, A.G., Curtin, C.M., Frassica, J. & McFarlane, D.C., Real-time infection prediction with wearable physiological monitoring and AI to aid military workforce readiness during COVID-19. *Sci Rep* 12(1):3797 (2022). <https://www.nature.com/articles/s41598-022-07764-6> , <https://doi.org/10.1038/s41598-022-07764-6>
- McFarlane DC, Doig AK, Agutter JA, Brewer LM, Syroid ND, Mittu R (2018) Faster clinical response to the onset of adverse events: A wearable metacognitive attention aid for nurse triage of clinical alarms. *PLoS ONE* 13(5): e0197157. <https://doi.org/10.1371/journal.pone.0197157>
- McFarlane, DC, Doig, AK, Agutter, JA, Mercurio, JL, Mittu, R, Brewer, LM, & Syroid, ND (2016) Defeating information overload in health surveillance using a metacognitive aid innovation from military combat systems, *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, DOI: 10.1177/1548512916667246, dms.sagepub.com, <http://dms.sagepub.com/content/early/2016/09/09/1548512916667246?papetoc>
- McFarlane, D. C. (2014) A Scare in the OR Highlights Value of System Engineering, *AAMI Horizons, Biomedical Instrumentation & Technology: Connecting the Dots*, Vol. 48, No. s2, pp. 44-50, doi: <http://dx.doi.org/10.2345/0899-8205-48.s2.44>.

Stand-Alone Refereed Journal Issue

- McFarlane, D.C., & Latorella, K. A. (2002) The scope and importance of human interruption in HCI design. *Human-Computer Interaction*, 17, 1–61.
- McFarlane, D.C. (2002) Comparison of four primary methods for coordinating the interruption of people in human-computer interaction, *Human-Computer Interaction*, 17, 63–139.

Book Chapter

- McFarlane D. C. (2006) Engaging Innate Human Cognitive Capabilities to coordinate Human Interruption: The HAIL System, in C. Gorry, M. L. Bernard, & T. E. Goldsmith (Eds.) *Cognitive Systems: Human Cognitive Models in Systems Design*, Lawrence Erlbaum Associated, pp. 137-152.