

Biographical Sketch – George H. Baker III, Ph.D.

Dr. George H. Baker brings extensive technical experience from his positions in academia, industry, and government to the effort. An associate professor at James Madison University's Department of Integrated Science and Technology, he also serves as the Technical Director of the university's Institute for Infrastructure and Information Assurance (IIIA). In addition to his teaching and administration duties, he presently serves as a consultant to the Defense Threat Reduction Agency, SAIC, Defense Group Inc, and National Research Council. Dr. Baker managed the initial start-up of the IIIA including development of the charter, design of the research program, structuring of the organization, name branding, marketing and press coverage. He currently directs the IIIA research program developing technology and techniques to improve homeland security. He is currently participating on the Congressional EMP Commission staff, the National Academy of Sciences Infrastructure Roundtable, the National Research Council Committee to Assess the U.S. Bureau of Reclamation Security Program, and the NDIA Homeland Security Executive Board.

In 1999, Dr. Baker joined the faculty of JMU's College of Integrated Science and Technology. In this position he has taught undergraduate laboratory courses in analytical methods, instrumentation & measurement, and energy. He is a member of the Foundations, S&T Social Context, and Energy Sector Committees. He has been involved with the development and implementation of the university's new intelligence analyst curriculum. He has served as a mentor for honors projects in the areas of high power electromagnetic effects, space radiation effects, pandemic flu modeling, and underground facilities. Dr. Baker developed and teaches a new complex systems course that is oriented toward critical infrastructure assurance. He has served as a consultant to DTRA, IDA, Northrop-Grumman, SAIC, and NSR in the areas of critical infrastructure assurance, high power electromagnetics, weapon effects, ground sensors and risk assessment. Courses taught include:

ISAT 142: Analytical Methods I

ISAT 152: Concepts of Applied Physics

ISAT 180H: Freshman Honors Projects

ISAT 212: Energy Issues in Science and Technology

ISAT 241: Analytical Methods III (Course Lead)

ISAT 300: Instrumentation and Measurement

ISAT 491, 492, 493: Senior Thesis I, II, III,

ISAT 499: Senior Honors Thesis

ISAT 515: Energy Systems

ISAT 560: Complex Systems and How They Fail (Course Developer, Lead)

Dr. Baker's industry experience includes roles as senior scientist at Northrop-Grumman and consultant for multiple organizations. As a Northrop-Grumman senior scientist in Alexandria, VA, Dr. Baker provided SETA support to the Defense Threat Reduction Agency in areas of hard target assessment, RF weapon design, nuclear electromagnetic

effects, information warfare, nuclear legacy programs, and critical infrastructure protection. His duties involved providing support for new program development, program implementation, and technical review/ critique of ongoing program results. He contributed to the development of test beds and functional defeat methodology for the hard target assessment program. He was Northrop's lead scientist for the initial development of the agency's Virtual Underground Test (VUGT) program. He served as a member of the Advanced System Concept Office's High Altitude Effects on Low Earth Orbit Satellites (HALEOS) Working Group.

From March 1996 to February 1999 Dr. Baker served as Director of the Springfield Research Facility, the assessment arm of the Defense Threat Reduction Agency, Dulles, VA. In this role, Dr. Baker directed the activities of a 70-member research organization recognized as the U.S. center of excellence for hardened and underground facilities survivability/vulnerability and related technology. Dr. Baker's organization provided assessments and research for a broad customer base including the Office of the Secretary of Defense, Assistant Secretary of Defense for C3I, the Director for Central Intelligence, the National Security Council, the Defense Intelligence Agency, several Unified and Specified Commands, the Joint Chiefs, the White House, the Critical Infrastructure Assurance Office, the Centers for Disease Control and NATO. His R&D activities provided new techniques and products for defeating hard targets and leading edge sensors (including seismic, acoustic, optical, and electromagnetic) for intelligence, targeting and protection applications. His division developed the first Force Protection vulnerability assessment methodology for Joint Chiefs of Staff and formed/deployed the first integrated vulnerability assessment teams. Dr. Baker deployed a sensor team to Iraq to search for nuclear proliferation materials. Dr. Baker served as Steering Group Chairman and Session Chair for the 1999 National HPM Symposium. He was invited to participate in the National Academy of Sciences initial workshop on U.S. infrastructure protection. During his tenure, Dr. Baker's program successes resulted in 25% overall budget growth due to additional customer funding. In 1998 he received the Defense Special Weapons Agency Legacy Award for his achievements in organization effectiveness and technology innovation.

From March 1994 to February, 1996 Dr. Baker was Chief, Innovative Concepts Division, Defense Nuclear Agency, Alexandria, VA. Dr. Baker managed a division with a \$30M annual budget involved in leading-edge technology development and applications. He managed the Agency's university grants and Small Business Innovative Research (SBIR) programs. He published the Agency's semi-annual technical newsletter. He initiated the Agency's joint U.S.-Russian TOPAZ space nuclear power program and the U.S. thermionics research program, interacting directly with the Kirchatov Institute in Moscow. He expanded the U.S. electric gun and electro-thermal-chemical (ETC) gun programs by successfully negotiating a cooperative research agreement with the U.S. Army. He led the development of the Undersecretary of Defense for Research and Engineering "Defense Technology Area Plan (DTAP)" for nuclear effects R&D.

From March 1987 to February 1994 Dr. Baker served as Electromagnetics Group Leader, Defense Nuclear Agency, Alexandria, VA. He managed the efforts of group of eight scientists involved in high power electromagnetics source development and effects assessment. He developed the Agency's source region EMP program including the rationale and program for source region underground test which resulted in \$99M Agency plus up. He founded the Agency's RF weapons program, developing and proving new RF weapons concepts using high power magneto-cumulative generators, magnetrons and relativistic klystrons. He developed national standards (MIL-STD-188-125 and MIL-HBK-463) and certification protocols for electromagnetic protection of backbone communications. He organized annual national and international symposia on electromagnetic effects. Dr. Baker's efforts tripled his group's annual budget during his tenure.

(a) Professional Preparation

Western Maryland College	Physics	Bachelor of Arts, 1971
University of Virginia	Physics	Master of Science, 1973
U.S. Air Force Institute of Technology	Engineering Physics	Ph.D., 1987

(b) Appointments

Technical Director and Associate Director of the Institute for Infrastructure and Information Assurance (IIIA), James Madison University (2002-present)

Associate Professor, Integrated Science and Technology, James Madison University (1999-present).

Principal Staff, Congressional Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack. (2002-present)

Director, Springfield Research Facility, Defense Threat Reduction Agency, Dulles, VA (1996-1999).

Member, National Research Council (NRC) Committee to Assess the U.S. Bureau of Reclamation Security Program (2006-present)

Member, National Defense Industry Association Homeland Security Executive Board (2004-present)

Chief, Innovative Concepts Division, Defense Nuclear Agency, Alexandria, VA. (1994-1996).

Integrated Electromagnetics Group Leader, Electronic Effects Division, Defense Nuclear Agency, 1987-94.

(c) Publications (1992-Present)

Also see http://works.bepress.com/george_h_baker/

1. G. Baker, C. Elliott, Cascading Infrastructure Failures: Avoidance and Response, Proceedings of the JMU/NAS Homeland Security Symposium, May 2008.
2. G. Baker, C. Elliott, Homeland Security: Engaging the Frontlines, Proceedings of the JMU/NAS Homeland Security Symposium, May 2007.
3. G. Baker, R. Little, "Enhancing Homeland Security: Development of a Course on Critical Infrastructure Systems," Journal of Homeland Security and Emergency Management, December 2006.
4. G. Baker, "A Vulnerability Assessment Methodology for Critical Infrastructure Facilities," Proceedings of the Department of Homeland Security's 2005 Research Symposium.
5. G. Baker, J. Rudmin, N. Olive, J. Darragh, "The Feasibility and Effectiveness of a Common Consumer Device as an Electromagnetic Interference (EMI) Source, International Conference on Electromagnetics in Advanced Applications 2005 Proceedings, ISBN 88-8202-094-0.
6. G. Baker, C. Mo, M. Carter, "Preliminary Peak Value Analysis of Conventional Explosives Radio Frequency (CERF) Signatures, Journal of Radiation Effects, 2005
7. G. Baker, S. Redwine et al, "Network Security Risk Assessment Modeling Tools for Critical Infrastructure Assessment," Proceedings of the Critical Infrastructure Protection Project Workshop, George Mason University, 2003.
8. G. Baker, D. Linger, R. Little, "Applications of Underground Structures for the Physical Protection of Critical Infrastructure," North American Tunneling 2002, ISBN 90 5809 376X.
9. G. Baker, T. Kennedy, "Nuclear Information Warfare," Journal of Radiation Effects, 2001.
10. G. Baker, K. Calahan, C. Mo, "Model for Characterizing the Effectiveness of Functional Defeat Strategies," Journal of Radiation Effects, 2000.
11. G. Baker, K. Calahan, C. Mo, "Functional Survivability Modeling Tool for Complex Facilities," EUROEM Conference Proceedings, Edinburgh, Scotland, May 2000.
12. G. Baker (organizer and moderator), Use of Underground Facilities to Protect Critical Infrastructures, Summary of a Workshop, National Research Council, 1998.

13. G. Baker, C. Mo, F. Tesche, "Calculational Models for Evaluating Electromagnetic Radiation from Buried Enclosures," *Journal of Radiation Effects*, 1997.
14. G. Baker, "The Assessment of Critical Infrastructure Vulnerabilities," *Proceedings, American Public Works Association Symposium*, 1997.
15. G. Baker (Chairman) et al, ELECTRA Program: Final Report, Defense Nuclear Agency, May 1995.
16. G. Baker et al, "The Defense Nuclear Agency Electromagnetic Safety Program," *Journal of Radiation Effects*, 1994.
17. G. Baker et al, "A Comparison of the Predicted and Measured Electromagnetic Pulse Response for Two Test Objects," *Proceedings of the Hardened Electronics and Radiation Technology Conference*, 1994.
18. G. Baker, M. Weitekamp, M. Bell, "Radio Frequency Contact Weapon Concepts and Effects," *Proceedings of the Seventh National Conference on High Power Microwave Technology*, Monterey, CA, 1994.
19. G. Baker, C. Mo, M. Weitekamp, "A Case Study Using a Global Positioning Satellite Receiver: the Accuracy of System Electromagnetic Response
20. G. Baker, J. Castillo, E. Vance, "Potential for a Unified Topological Approach to Electromagnetic Protection," *IEEE Transactions on Electromagnetic Compatibility*, August 1992.

(d) Synergistic Activities

Member, National Research Council Committee to Evaluate the Security Program of the U.S. Bureau of Reclamation, 2006-2008

Chair, Homeland Security Symposium Planning Committee, in cooperation with the National Academy of Sciences' Federal Facilities Council, 2006/2007/2008

Executive Advisory Board (ex officio), James Madison Institute for Infrastructure and Information Assurance

Commonwealth of Virginia Critical Infrastructure Protection Working Group, 2003-Present

Founding member, Virginia Alliance for Secure Computing and Networking (VASCAN), 2003 – present

Co-Chair, Non-Proliferation and Arms Control (NPAC) Underground Focus Group, 1996-99

Chair, Underground Site Infrastructure Applications Working Group, 1998-99

U.S. Chair, International Tri-partite Technical Cooperation Program (TTCP) EMP Group, 1988-94

Session Chair, 1998 Nuclear EURO Electromagnetics (EUROEM) Symposium, Tel Aviv, Israel.

Member, DoD Joint RF Coordinating and Technical Interchange Group (JRFCTIG), 1996-99

Member, Under Secretary of Defense for Research and Engineering Technology Panel on Directed Energy Weapons, 1995-99

Member, Nonlethal Weapon Steering Group (Under Secretary of Defense for Acquisition and Technology), 1995-99

(e) Collaborators & Other Affiliations

Dr. John Noftsinger, Vice Provost, James Madison University (JMU)

Prof. Ronald Kander, Chair, Department of Engineering, JMU

Prof. Stephen Stewart, former Chair, Department of Public Health, JMU

Dr. William Graham, Chair, Congressional EMP Commission

Dr. Don Linger, former Director of Nuclear Underground Testing, Defense Nuclear Agency

Prof. Richard Little, Director, Keston Institute, University of Southern California

MG Gary Curtin (ret'd), former Director, Defense Nuclear Agency

Ms Lynda Stanley, Director, National Research Council Board on Infrastructure and the Constructed Environment

Lt Gen Henry Hatch (ret'd), former Director, US Army Corps of Engineers

Prof. John McCarthy, former Director, George Mason University Critical Infrastructure Program

Mr. William Yeakel, President/CEO, Orsa Corporation

Dr. Ruth David, President/CEO, ANSER Corporation

Ms. Patricia Ann Buckingham, Director of FEMA/DoD Liaison Office, DHS

Prof. Michael Deaton, Integrated Science and Technology, JMU

Dr. Mark Kirk, DHS Office of Toxicology

Prof. Peter Pham, Director, Nelson Institute of Public Policy, JMU

Prof. Ann Henriksen, Chair, S&T Foundations Committee, JMU

Dr. Albert Costantine, SAIC

Mr. Michael Becraft, VP, SI International

Dr. Ira Kohlberg, Kohlberg Associates

Prof. Carl Baum, University of New Mexico

Dr. William Radasky, President, Metatech

Dr. William Crevier, L3 Corporation

Dr. Michael Bernardin, Los Alamos National Laboratories