Michael A Forman

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OBJECTIVE   Obtain position utilizing abilities to:

- Collaborate and advise on research projects in areas of expertise;
- Actively seek funding through proposal writing and presentation;
- Provide support as a technical team lead and project manager;
- Employ critical thinking to develop innovative solutions; and
- Use knowledge of cultures and languages to facilitate collaboration in international business settings.

RESEARCH AND
EXPERIENCE

Senior Member of the Technical Staff,
Telemetry and Instrumentation

Sandia National Laboratories
Albuquerque, NM
April 2001 – Present

Oct 2002
Present

Principal investigator on a two-year Laboratory Directed Research and Development (LDRD) grant to study micromachined high-aspect-ratio coplanar-waveguide (CPW) transmission lines created utilizing the LIGA process. Independently conceived and proposed the concept. Performed all scheduling, budgeting, and design.

Simulations were performed using *Ansoft*'s High Frequency Structure Simulator (HFSS). The micromachined lines exhibit the lowest documented conductor and dielectric loss of any preexisting CPW transmission line. Initial structures have been submitted for fabrication and are expected to be delivered and characterized by the end of 2003 with publications to follow.

Oct 2001
Present

Technical team lead for the *Pleiades* unattended ground sensor (UGS) communications subsystem under a three-year Laboratory Directed Research and Development (LDRD) grant. Performed a trade study on commercial off-the-shelf network radios. Defined a modified dynamic source routing (DSR) algorithm, to provide a self-healing ad-hoc network for UGS communications. Performed a first-order approximation of system power consumption based on physical and data-link layer definitions.

Contributed to a study, measuring RF propagation losses associated with near-ground transmission. Provided initial work on the detectability (LPD/LPI) of such a system. Researched the fundamentals of securing a network through authentication and encryption employed with varying complexity on each of the different network layers. Submitted a phased-array antenna proposal for use in an ad-hoc network of unattended ground sensors for the Sandia Lab Directed Research and Development (LDRD) call for ideas.

Oct 2001
Jul 2002

Designed, fabricated, and tested a cavity-backed dielectric-rod feed antenna for use in a classified synthetic aperture radar (SAR) application. Chose a novel feed to meet tight volumetric constraints imposed by an existing gimbal, reflector, and radome. Met

targets for gain, sidelobe levels, cross-polarization, and bandwidth. Characterized and tuned the feed in an anechoic chamber. Delivered a second design under a tight schedule to reduce beam squint. Performed simulations using *Ansoft*'s High Frequency Structure Simulator (HFSS), custom physical optics code, and a parametric simulation wrapper written in Perl and executed in Cygwin.

Apr 2001
Oct 2001

Designed, implemented, and tested a commercial satellite link, integrating existing National Missile Defense (NMD) test-and-measurement infrastructure with data-visualization hardware with the goal of providing near real-time 3D display of remotely collected telemetry. Visualization was performed with *Analytical Graphics*' Satellite Tool Kit (STK). Built a secure OpenBSD Unix server with an ISDN interface to receive and serve incoming telemetry data.

Research Assistant,   **University of Colorado at Boulder**
Active Antenna and Circuits Group   **Boulder, CO**
                                                      1997 − 2001

Designed, fabricated, and characterized *Ka*-band active-amplifier antenna arrays for Watt-level millimeter-wave power combining. System requirements met by performing trade studies over various electrical, thermal, and mechanical substrate properties, antenna designs, and array configurations. Fabrication of the arrays was performed using photolithographic techniques borrowed from and performed in the University of Colorado's solid-state laboratory. Additional fabrication techniques included gold electroplating, GaAs MMIC mounting, and wire bonding. Arrays characterized using state-of-the-art millimeter-wave equipment, as well as near-field electro-optic measurements performed in collaboration with the University of Michigan.

Independently conceived, designed, fabricated, and measured a *K*-band full-duplex transmit-receive active-amplifier array, the first and only stable full-duplex transmit-receive active-antenna array. Employed an efficient array feed and simplified the array design to reduce fabrication time and complexity. Conductor-backed finite-width coplanar waveguide (CPW) transmission lines were employed to eliminate the need for air bridges or vias. Work was funded by Lockheed Martin and the California Institute of Technology under a joint Army Research Office MURI program.

Communications Subsystem Team Lead   **University of Colorado at Boulder**
Colorado Space Grant   **Boulder, CO**
                                                      Summer 1998

Communications subsystem team lead for Colorado Space Grant Consortium's "Citizen Explorer" satellite program. Installed and tested a ground station based on amateur-radio satellite technology. Created link budgets, performed trade studies, and measured satellite transmission hardware.

Systems Administration,   **University of Colorado at Boulder**
Computational Electromagnetics Group   **Boulder, CO**
                                                      1997 − 2000

Managed and maintained a cluster of HPUX Unix workstations used for electromagnetic simulations. Selected and installed electromagnetic simulation packages for the research groups. Implemented a pair of redundant disks (RAID level 1) with an automated remote tape backup system (`amanda`) to secure data. Improved security by deploying a centrally controlled security monitoring and distribution system.

Teaching Assistant	**University of Colorado at Boulder**
Undergraduate Electromagnetics	**Boulder, CO**
	1995 − 1996

Instructed two semesters of undergraduate introductory-electromagnetics laboratory. Created an original lab based on motor theory and an in-lab final exam on time-domain reflectometry published in the workbook accompanying the textbook *Introductory Electromagnetics* written by Zoya Popović and Branko D. Popović.

Systems Administrator	**University of Colorado at Boulder**
UnixOps	**Boulder, CO**
	1993 − 1995

Provided customer support and campus-wide Unix system administration. Experience with all varieties of Unix: HPUX, Linux, Solaris, IRIX, and AIX. Created a lexer-parser for a campus-wide remote distribution system. Gained experience in effectively handling and coordinating multiple tasks. Responsible for the maintenance and update of the campus LaTeX distribution.

EDUCATION

Ph.D., Electrical Engineering, May 2001; GPA: 4.0
"Active-Antenna Arrays for Power Combining and Communications"
Advisor: Dr. Zoya Popović
University of Colorado, Boulder, CO

M.S., Electrical Engineering, Spring 1998; GPA: 3.93
Advisor: Dr. Zoya Popović
University of Colorado, Boulder, CO

B.S., Electrical Engineering, Fall 1995; GPA: 3.75
University of Colorado, Boulder, CO

SPECIAL SKILLS

- Languages: advanced-intermediate German, intermediate French, and beginning Japanese; basic familiarity with Latin, and Mandarin.
- Expert knowledge of the Unix operating system and all related applications.
- Expert knowledge of programming languages: C^{++}, Perl, PHP, and HTML.
- Expert knowledge of the professional typesetting package LaTeX.
- Strong writing, grammar, and linguistic skills.
- Strong graphic-design skills useful in presentations, publications, and schematics.

HONORS

- Eta Kappa Nu (HKN) – Electrical Engineering Honor Society.
- Officer HKN – Elected to the office of Secretary of Correspondence.
- Tau Beta Pi (ТВП) – National Engineering Honor Society.
- Golden Key National Honor Society.
- Dean's List: 1991, 1992, 1994, 1995.

Michael A Forman

JOURNAL PUBLICATIONS

M. Forman, T. Marshall, and Z. Popović, "Two Ka-Band Quasi-Optical Amplifier Arrays," *IEEE Transactions on Microwave Theory and Techniques*, December 1999, vol. 47, pp. 2568-2573

K. Yang, G. David, W. Wang, T. Marshall, M. Forman, L.W. Pearson, Z. Popović, L.P.B. Katehi, and J.F. Whitaker, "Electro-Optic Field Mapping of Quasi-Optic Power-Combining Arrays," *1999 OSA Topical Meeting on Ultrafast Electronics and Optoelectronics*, April 1999

REFEREED CONFERENCE PROCEEDINGS

M. Forman, J. Vian, and Z. Popović, "A *K*-Band Full-Duplex Transmit-Receive Lens Array," *IEEE MTT-S International Microwave Symposium Digest*, June 2001

M. Forman, T. Marshall, and Z. Popović, "Two Ka-Band Quasi-Optical Amplifier Arrays," *IEEE MTT-S International Microwave Symposium Digest*, June 1999

T. B. Mader, E. W. Bryerton, M. Marković, M. Forman, and Z. Popović, "Switched-Mode High-Efficiency Microwave Power Amplifiers in a Free-Space Power Combining Array," *IEEE MTT-S International Microwave Symposium Digest*, June 1998

CONFERENCE PRESENTATIONS

M. Forman and Z. Popović, "A K-Band Ground-Backed CPW Balanced Coupler and Integrated Antenna Feed," *European Microwave Conference*, October 2000

M. Forman, T. Marshall, and Z. Popović, "Watt-Level Ka-Band Quasi-Optical Amplifier Arrays," *European Microwave Conference*, October 1999

T. Marshall, M. Forman, and Z. Popović, "Ka-Band Quasi-Optical Amplifier Arrays on AlN," XXVIth *General Assembly of the International Union of Radio Science*, August 1999, p. 687

K. Yang, G. David, W. Wang, T. Marshall, M. Forman, L. W. Pearson, Z. Popović, L. P. B. Katehi, and J. F. Whitaker, "Electro-Optic Field Mapping of Quasi-Optic Power-Combining Arrays," *Ultrafast Electronics and Optoelectronics Conference, Technical Digest Series, Optical Society of America,* Washington DC, 1999, pp. 30-32

J. Baltrush, M. Forman, E. Hansen, S. Horan, E. Riddle, and D. Rodier, "Advancing Radio Communications Technology with the Citizen Explorer Mission," *16th AMSAT-NA Space Symposium and AMSAT Annual Meeting,* October, 1998

M. A. Forman and Z. B. Popović, "A tunable second-resonance cross-slot antenna," *1997 IEEE AP-S Int. Symp. Dig.*, Montreal, Canada, pp. 18-21, July 1997

T. Mader, E. Bryerton, M. Forman, and Z. Popović, "High-efficiency switched-mode microwave amplifiers," *1996 URSI National Radio Science Meeting*, Boulder, CO, January 1996