KARL F. NIEMAN

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OBJECTIVE

Looking for a summer R&D internship in multi-antenna communication systems.

SUMMARY OF QUALIFICATIONS

Ph.D. student with published work in digital communications, antenna design, and acoustics with eight years of diverse, implementation-centric research/design experience.

- Especially skilled at embedded signal processing as well as technical writing.
- Proven ability of effective project management and a talent for collaborating well.

EDUCATION

Ph.D. Electrical Engineering, The University of Texas at Austin, Austin, TX Dec 2014
Adviser: Prof. Brian L. Evans, GPA 3.52/4.0
Relevant courses: Analysis and Design of Communication Networks, Multiscale/Multirate Signal Processing, Wireless Communications, Network Architecture/Protocols, Optimization in Engineering Systems, Probability and Stochastic Processes, Real Analysis, Mathematical Statistics, Optoelectronic Devices, Radar Principles, Antenna Theory and Practice, Electromagnetic Field Theory, Measurement and Instrumentation

M.S. Electrical Engineering, The University of Texas at Austin, Austin, TX Dec 2011
Adviser: Prof. Brian L. Evans, GPA 3.48/4.0

B.S. Electrical Engineering, New Mexico Tech, Socorro, NM May 2009
Graduated *Summa Cum Laude*, GPA 3.75/4.0

WORK EXPERIENCE

PhaseSinc Solutions, LLC, Austin, TX; *Owner/Design Consultant* 2012 to Present

- Provided technical consulting for implanted medical device antenna design.
- Developed finite-element, CAD-based, multi-material model of device and antenna.

Cirrus Logic, Inc., Austin, TX; *Technical Intern* 2012

- Verified mixed signal integrated circuits for large-volume, high-fidelity audio applications.
- Wrote/managed Verilog HDL test database used to verify IC design and produced functional coverage models to improve pre-silicon design confidence.

Applied Research Laboratories, Austin, TX; *Graduate Research Assistant* 2009 to 2012

- Led research effort to evaluate tradeoffs in underwater acoustic communication system design with an emphasis on space-time signal processing for large array receivers.
- Developed software to catalogue, process, and visualize large experimental data sets.
- Implemented physical layer algorithms for wideband direction finding, beamforming, Doppler detection/compensation, adaptive MIMO equalization, and error-correcting code.
- Designed/implemented/demoed real-time test platform for state-of-the-art tactical acoustic communications system using large array receiver.
- Developed low cost, low power, high data rate capable acoustic transponder system.

ITT Advanced Engineering and Sciences, Albuquerque, NM; *Technical Intern* 2008 to 2009

- Designed compact mixed-signal printed circuit boards for handheld laser control systems.
- Developed firmware for embedded YAG-laser temperature controller.

Sandia National Laboratories, Albuquerque, NM; *Technical Intern* 2004 to 2008

- Provided direct technical support to research group specialized in cutting-edge brittle material systems (e.g. MEMS, thick film resistors, hermetic seals, medical implantable devices).
- Used destructive and non-destructive techniques to study crack growth and fracture behavior.
- My results were used to refine finite element models and guide future component design.

PUBLICATIONS

K. F. Nieman, J. Lin, M. Nassar, B. L. Evans, and K. Waheed, "Cyclic Spectral Analysis of Power Line Noise in the 3-200 kHz Band", Proc*. IEEE Int. Symp. on Power Line Communications and Its Applications*, Mar. 24-27, 2013, Johannesburg, South Africa, accepted for publication.

H. Huang, **K. Nieman**, P. Chen, M. Ferrari, Y. Hu, and D. Akinwande, "Properties and applications of electrically small folded ellipsoidal helix antenna", *IEEE Antennas and Wireless Propagation Letters*, 2012.

H. Huang, **K. Nieman**, Y. Hu, and D. Akinwande, "Electrically small folded ellipsoidal helix antenna for medical implant applications", *IEEE International Symposium on Antennas and Propagation*, July 3-8, 2011, Spokane, Washington USA.

K. A. Perrine, **K. F. Nieman**, T. L. Henderson, K. H. Lent, T. J. Brudner and B. L. Evans, "Doppler estimation and correction for shallow underwater acoustic communications", *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 7-10, 2010, Pacific Grove, California USA.

K. F. Nieman, K. A. Perrine, K. H. Lent, T. L. Henderson, T. J. Brudner and B. L. Evans, "Multistage and sparse equalizer design for communication systems in reverberant underwater channels", *Proc. IEEE Int. Workshop on Signal Processing Systems*, Oct. 6-8, 2010, Cupertino, California USA.

K. F. Nieman, K. A. Perrine, T. L. Henderson, K. H. Lent, T. J. Brudner and B. L. Evans, "Wideband monopulse spatial filtering for large array receivers for reverberant underwater communication channels", *Proc. IEEE OCEANS*, Sept. 20-23, 2010, Seattle, WA USA.

D. Oliver, T. A. Wallner, R. Tandon, **K. Nieman**, P. L. Bergstrom, "Diamond scribing and breaking of silicon for MEMS die separation", *Journal of Micromechanics and Microengineering*, vol. 18, no. 7, 075026, 2008.

More available upon request

SKILLS

Programming: MATLAB, C/C++, Java, LabVIEW Base/Real-Time/FPGA, Verilog, VHDL/AHDL, PERL/BASH scripting, HTML, ASM
Embedded Platforms: TI MSP430, Xilinx Virtex V, TI TMS320C67x DSP, Microchip PIC16
Modeling: Cadence, COMSOL, SPICE, NEC
Engineering Software: IAR Kickstart, TI Code Composer Studio, P-CAD (Altium), MultiSim/UltiBoard, SolidWorks
Instrumentation: oscilloscopes, RF signal generation/acquisition, network analyzers, PXI chassis
Office Applications: LaTeX, Microsoft Office, Google Productivity Apps, Adobe Photoshop
Other: optical design/testing, electronics assembly, machining, mechanical assembly

ACADEMIC PROJECTS

FPGA Implementation of Sparse Bayesian Learning Denoising for OFDM May 2012
Vertex 5 implementation of impulsive noise mitigation technique for OFDM communication systems.

Wideband Sparse Aperture Imaging via Compressive Reconstruction Dec 2011
Developed framework to reconstruct wideband radar/sonar target scene images from undersampled space-time samples, achieving improved resolution and reduced sidelobes vs. classical methods.

Folded Ellipsoidal-Helix Antenna for Low Power Medical Implanted Devices May 2010
Designed highly efficient, electrically small antennas for use in implanted medical devices.

Doppler Compensation for Shallow Underwater Acoustic Channels Dec 2009
Developed new techniques for higher-order (time-varying) Doppler estimation and correction.

Webcam-based Optical Wavefront Sensor May 2009
Developed a USB webcam-based optical wavefront sensor for use in adaptive optics.
Designed mechanical fixtures to house fragile optical assemblies—i.e. microlens arrays.

Particle Accelerator Beam Position and Phase Measurement System May 2009
Designed a real-time direct downconversion FPGA-based instrumentation system to measure H+/H- particle beam position and phase in drift tube of Los Alamos Labs' LANSCE linear accelerator.

AWARDS/HONORS

Recipient: 2012-2013 Cirrus Logic Graduate Intern Scholarship
- Selected for award given to one of 31 Summer 2012 interns

ACTIVITIES AND INTERESTS

Professional societies: IEEE Student Member, Tau Beta Pi Student Member
Professional qualifications: Engineer-In-Training, FE Exam passed May 2009
Reviewer: IEEE Journal of Oceanic Engineering 2012
Reviewer: IEEE International Communications Conference (ICC) 2012, 2011
Reviewer: IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2013
Reviewer: IEEE International Conference on Telecommunications (ICT) 2012
Reviewer: IEEE Global Communication Conference (Globecom) 2012, 2011, 2010
Recreation: snowboarding, endurance biking/running, hiking, oil painting, pencil drawing, saxophone

REFERENCES

Available upon request