KLAUS OKKELBERG

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OBJECTIVE

Electrical and computer engineer seeking challenging employment opportunities at Lockheed Martin

EDUCATION

University of New Orleans, New Orleans, LA — 2014
M.S.E. in Electrical Engineering
Thesis topic: Nonlinear filtering for battery state estimation and health management
GPA: 4.0/4.0

The Pennsylvania State University, University Park, PA — 2011
B.S. in Electrical Engineering, Schreyer Honors College
Honors thesis topic: Nonlinear control system for nuclear magnetic spectroscopy
GPA: 3.8/4.0

EXPERIENCE

Georgia Tech, Atlanta, GA

Graduate Researcher with Dr. Maysam Ghovanloo — Aug. 2014 – Present

- Examined a Multimodal Speech Capture System (MSCS) for speech therapy and accent reduction, using aural, visual and magnetic modalities to track articulator motion
- Developed portable, wearable, wireless systems using Solidworks
- 3D-printed prototype systems in ABS
- Designed PCB with FPGA and Raspberry Pi for real-time data collection
- Extended IPA vowel diagram with consonant phoneme locations
- Optimized magnetic sensor calibration and localization algorithms
  - Reduced RMS error from >15 mm to 1.8 mm for stationary system, comparable to state-of-art electromagnetic articulography (EMA) at hundredth of cost
  - Achieved 4.6 mm RMS error for portable, headset system
- Trained hybrid system of deep neural network (DNN) and support vector machines (SVM) for silent speech recognition of ~100 words/phrases
  - Speaker-independent recognition, using single-magnet modality
  - Top-3 classification error <3% and top-1 error of 13%

Graduate Teaching Assistant — Aug. 2015 – Dec. 2016

- GaTech ECE 3030, Physical Foundations of Computer Engineering (physics of MOSFET operation)
- GaTech ECE 2031, Digital Design Lab, part of the school's Undergraduate Professional Communication Program (UPCP)
  - Course on programming FPGAs for control of three-wheeled robots
  - Provided writing assistance to all undergraduate students in the Electrical and Computer Engineering department as part of UPCP
- Graduate TA for GaTech Math 4221, Stochastic Processes

Xilinx, Inc., San Jose, CA

Electrical Engineering Intern — June 2014 – Aug. 2014

- Improved computer mathematical modeling of physical, 16 nm (UltraScale+) field-programmable gate array (FPGA) devices through Cadence modeling and Matlab/Verilog simulation
  - Focused on simultaneous switching noise
  - Increased accuracy of model to physical result by 20%
- Created new automated tool for inspecting multiple chip designs
  - Improved simulation speed over previous tool by a factor of 15

Experience (continued)

University of New Orleans, New Orleans, LA

Research Assistant with Dr. Huimin Chen — July 2012 – May 2014

- NASA-funded Masters through Ames Research Center Scholarship
- Studied accuracy and speed of various nonlinear filters for estimating battery state of charge for battery health management
- Researched use of Extended Kalman Filter for highly nonlinear systems through stochastic gradient estimation
- Proposed adjustments to the Unscented Kalman Filter and the Cubature Kalman Filter that increase filtering stability and accuracy

Pennsylvania State University, University Park, PA

Research Assistant with Dr. Jeffrey L. Schiano — Mar. 2010 – May 2011

- Researched a marginal oscillator with an arbitrary nonlinear feedback element for use in nuclear magnetic spectroscopy
- Studied continous-time and sampled-data feedback implementations using negative resistance converters and FPGAs, respectively
- Compared conversion gain and sensitivity of circuit for different feedbacks
- Optimized speed of simulation model by a factor of 100

Selected Publications

"Joint Magnetic Calibration and Localization Based on Expectation Maximization for Tongue Tracking," IEEE Transactions on Biomedical Engineering, 2017.

"Comparison of Nonlinear Filtering Methods for Battery State of Charge Estimation," University of New Orleans, 2014.

"Conversion Gain and Sensitivity in Marginal Oscillators: Continuous and Sampled-Data Negative Resistance Converters," The Pennsylvania State University, 2011.

Projects

- Optimal load balancing for high voltage power distribution system
- Model Predictive Control (MPC) method for steering rocket propulsion system
- Studied high-gain adaptive observer for monitoring of battery state of charge and for detection of short circuits
- Compared signal and channel estimation methods for CP-OFDM communications
- Analyzed performance of MIMO configurations for LTE-Advanced
- GoPro-based underwater fish recognition and tracking using FAST SURF feature matching and dark channel prior transmission map estimation
- Video jitter removal and stabilization using point feature matching and phase correlation
- Image reconstruction from incomplete, quantized measurements using discretized solution of Euler-Lagrange equation
- Vehicle tracking on changing terrain using dual nonlinear filtering of state and operating parameters
- Investigation of resonant tunneling through a double-barrier diode
- Quantum interference visibility in an oscillating macroscopic mirror
- High-speed adaptive decision feedback equalization for SerDes communications

Notes

Software: Matlab, Simulink, PSPICE, Multisim, AutoCAD, Solidworks, Abaqus, GIT, MS Office

Programming: Matlab, Fortran, C/C++, Java, Javascript, Python, VHDL, Verilog, Visual Basic, Perl, Tcl/Tk, Haskell, LabView, LaTeX, TensorFlow, scikit-learn, Keras, Jupyter

Leadership: Organized local cycling group, created student running club, president of table tennis club

Volunteering: Habitat for Humanity, Bike Around the Bay, Penn State THON, dog fostering

Work Authorization: US Citizen