

# John Donnal

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## Employment

### United States Naval Academy

Assistant Professor, Weapons and Systems Engineering Aug 2016 – present  
105 Maryland Ave / Annapolis, MD 21402 / (410)-293-6109

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## Education

### Massachusetts Institute of Technology

Doctoral Program in Electrical Engineering 2016  
Degree of Electrical Engineer 2015  
M.S. in Electrical Engineering 2013

### University of Maryland University College

M.S. in Information Assurance 2009

### Princeton University

B.S.E in Electrical Engineering 2007  
Magna Cum Laude

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## Honors and Awards

IEEE Instrumentation and Measurement Society: Best Sensor Application 2016  
Department of Energy Cleantech University Prize (\$100K) 2016  
MIT Clean Energy Prize (\$100K) 2016  
Martin Family Society Fellow 2013  
US Army Meritorious Service Medal: Operation Iraqi Freedom 2009  
Tau Beta Pi: Engineering Honor Society 2006  
Sigma Xi: Society for Research Engineers 2007

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## Patents

*Energy Apps.* Donnal, J.; Paris, J.; Leeb, S. Provisional Patent Application No.: 62/242618. Filing Date: October 16, 2015.

*Non-Intrusive Monitoring.* Leeb, S.; Paris, J.; Donnal, J.; Moon, J.; Schantz, C. Patent Application No.: US 20140320125 A1. Publication Date: October 30, 2014.

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## Military Assignments

Tactical Signal Battalion Network Operations Officer 2010-2011  
*Fort Bragg, NC*  
Director of Network Plans and Projects for the Iraqi Theater of Operations 2009-2010  
*Camp Liberty, Iraq*  
Heavy Expeditionary Signal Platoon Leader 2007-2009  
*Fort Bragg, NC*

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## Co-Supervised Students

- Daisy Green, M.S. Candidate Electrical Engineering Feb 2018 – present  
Thesis topic: *Framework for Non-Intrusive Monitoring for Shipboard Environments*  
Co-Advisors: Dr. Steven B. Leeb, Dr. Pete Lindahl
- Andre Aboulian, M.S., Electrical Engineering June 2016 – Feb 2018  
Project topic: *Sensor and network development for nonintrusive load monitoring*  
Co-Advisors: Dr. Steven B. Leeb, Dr. Pete Lindahl
- LT Greg Bredariol, M.S., Mechanical Engineering July 2015 – June 2016  
Project topic: *Automated energy management using nonintrusive load monitors*  
Co-Advisors: Dr. Steven B. Leeb, Dr. Pete Lindahl
- David Lawrence, M.S. Electrical Engineering Sep 2014 – Feb 2016  
Thesis: *Hardware and software architecture for non-contact NILM*  
Co-Advisors: Dr. Steven B. Leeb
- LT Ryan Zachar, Naval Engineer, M.S. Engineering & Management Sep 2013 – June 2015  
Thesis: *Naval applications of enhanced temperature, vibration and power monitoring*  
Co-Advisors: Dr. Steven B. Leeb, Dr. Pete Lindahl
- LT William Cotta, M.S. Mechanical Engineering Sep 2013 – June 2015  
Thesis: *Machinery diagnostics and characterization through electrical sensing*  
Co-Advisors: Dr. Steven B. Leeb, Dr. Pete Lindahl
- MAJ Mark Gillman, M.S. Electrical Engineering Sep 2012 – June 2014  
Thesis: *Interpreting Human Activity from Electrical Consumption Data through NILM*  
Co-Advisors: Dr. Steven B. Leeb

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## Publications

### Journals

- Aboulian, A. *et al.*, "NILM Dashboard: A Power System Monitor for Electromechanical Equipment Diagnostics," in *IEEE Transactions on Industrial Informatics*. 2018, Early Access
- Donnal, J.** "Joule: A Real Time Framework for Decentralized Sensor Networks," in *IEEE Internet of Things Journal*. 2018, Early Access
- Aboulian, A., **Donnal, J.** and Leeb, S. "Autonomous Calibration of Non-Contact Power Monitors," in *IEEE Sensors Journal*, vol. 18, no. 13, pp. 5376-5385, July. 1, 2018.
- Donnal, J.**, Lindahl, P., Lawrence, D., Zachar, R., and Leeb, S, "Untangling Non-Contact Power Monitoring Puzzles," in *IEEE Sensors Journal*, vol. 17, no. 11, pp. 3542-3550, June, 1 2017.
- Lawrence, D.; **Donnal, J.**; Leeb, S.; He, Y., "Non-contact Measurement of Line Voltage," in *IEEE Sensors Journal*, vol. 16, no. 24, pp. 8990-8997, Dec, 15 2016.
- Donnal, J.**; Paris, J.; Leeb, S., "Energy Applications for an Energy Box," in *IEEE Internet of Things Journal*, 2016, vol. 3, no. 5, pp. 787-795, Oct. 2016.

- Lawrence, D., **Donnal, J.**, and Leeb S., "Current and Voltage Reconstruction From Non-Contact Field Measurements," in *IEEE Sensors Journal*, vol. 16, no. 15, pp. 6095-6103, Aug. 1, 2016.
- Zachar, R.; Lindahl, P.; **Donnal, J.**; Cotta, W.; Schantz, C.; Leeb, S., "Utilizing Spin-Down Transients for Vibration-Based Diagnostics of Resiliently Mounted Machines," in *IEEE Transactions on Instrumentation and Measurement*, , vol. 65, no. 7, pp. 1641-1650, July 2016
- Orji, U.A.; Schantz, C.; Gerhard, K.; **Donnal, J.**; Moon, J.; Sievenpiper, B.; Leeb, S.; Thomas, K., "Retrofittable Machine Condition and Structural Excitation Monitoring from the Terminal Box," in *IEEE Sensors Journal*, vol. 16, no. 5, pp. 1224-1232, March 1, 2016.
- Orji, U.A.; Remscrim, Z.; Schantz, C.; **Donnal, J.**; Paris, J.; Gillman, M.; Surakitbovorn, K.; Leeb, S.B.; Kirtley, J.L., "Non-intrusive induction motor speed detection," in *Electric Power Applications, IET* , vol.9, no.5, pp.388-396, 5 2015
- Schantz, C.; **Donnal, J.**; Sennett, B.; Gillman, M.; Muller, S.; Leeb, S., "Water Nonintrusive Load Monitoring," in *Sensors Journal, IEEE* , vol.15, no.4, pp.2177-2185, April 2015
- Donnal, J.**; Leeb, S.B., "Noncontact Power Meter," in *Sensors Journal, IEEE* , vol.15, no.2, pp.1161-1169, Feb. 2015
- Paris, J.; **Donnal, J.**; Remscrim, Z.; Leeb, S.B.; Shaw, S.R., "The Sinefit Spectral Envelope Preprocessor," *Sensors Journal, IEEE* , vol.14, no.12, pp.4385,4394, Dec. 2014
- Paris, J.; **Donnal, J.**; Cox, R.; Leeb, S., "Hunting Cyclic Energy Wasters," *Smart Grid, IEEE Transactions on* , vol.5, no.6, pp.2777,2786, Nov. 2014
- Paris, J.; **Donnal, J.**; Leeb, S.B., "NilmDB: The Non-Intrusive Load Monitor Database," *Smart Grid, IEEE Transactions on* , vol.5, no.5, pp.2459,2467, Sept. 2014
- Gillman, M.D.; **Donnal, J.**; Paris, J.; Leeb, S.B.; El Sayed, M.A.H.; Wertz, K.; Schertz, S., "Energy Accountability Using Nonintrusive Load Monitoring," *Sensors Journal, IEEE* , vol.14, no.6, pp.1923,1931, June 2014

## Conferences

- Donnal, J.**, Frontera, P., Broussard, R., Bush, M., Snyder, M. "Applied Research Aboard the USNA YP Fleet" ASNE Technology Systems, and Ships (TSS), Washington DC, June 18-20 2018
- Kane, T. et al. "NILM: Smarter Shipboard Monitoring for the Modern Fleet" ASNE Advanced Machinery Technology Symposium, Philadelphia PA, March 28-29 2018
- Donnal, J.**, Schantz, C., Moon, J., Lindahl, P., Leeb, S. "Stethoscopes for Nonintrusive Monitoring" 2017 IEEE Sensors Applications Symposium (SAS), Glassboro, NJ, USA, 2017, pp. 1-6.
- Nation, J., Aboulhian, A., Green, D., Lindahl, P., **Donnal, J.**, Leeb, S. "Nonintrusive Monitoring for Shipboard Fault Detection" 2017 IEEE Sensors Applications Symposium (SAS), Glassboro, NJ, USA, 2017, pp. 1-5.
- Lindahl, P., Lt. G. Bredariol, **Donnal, J.**, Leeb, S. "Non-contact Sensors and Nonintrusive Load Monitoring (NILM) Aboard the USCGC SPENCER." *2016 IEEE AUTOTESTCON*, Anaheim, CA, 2016, pp. 1-10.

- Moon, J., Lindahl, P., **Donnal, J.**, Lt. R. Zachar, Schantz, C., Lt. W. Cotta, Leeb, S. "A Nonintrusive Magnetically Self-powered Vibration Sensor for Automated Condition Monitoring of Electromechanical Machines." 2016 IEEE AUTOTESTCON, Anaheim, CA, 2016, pp. 1-7.
- Lt G. Bredariol (USCG), **Donnal, J.**, Lindahl, P., Leeb, S. "Automatic Watchstander Through NILM Monitoring." ASNE Day 2016. March, 2016.
- Donnal, J.**; Leeb, S.B., "WattsWorth: Monitor electric power anywhere," *Applied Power Electronics Conference and Exposition (APEC), 2014 Twenty-Ninth Annual IEEE* , vol., no., pp.2223,2230, 16-20 March 2014
- Gillman, M.; Singleton, W.; Wilson, R.; Cotta, W.; **Donnal, J.**; Paris, J.; Leeb, S. "Accounting for Every Kilowatt". Defense AT&L. Defense Acquisition Univ Ft. Belvoir VA. Oct. 2014
- Schantz, C.; Sennet, B.; **Donnal, J.**; Leeb, S.; Gillman, M. "Non-Intrusive Load Monitoring for Water (WaterNILM)". *Urban Water II*. Ed. S. Mambretti, C.A. Brebbia. Vol. 139. 2014
- Schantz, C.; **Donnal, J.**; Leeb, S.; Marimuth, P. N.; Habib, S. "WaterWOLF: Water Watch on Load Flow". *Urban Water II*. Ed. S. Mambretti, C.A. Brebbia. Vol. 139. 2014
- Moon, J.; **Donnal, J.**; Paris, J.; Leeb, S., "VAMPIRE: A magnetically self-powered sensor node capable of wireless transmission," *Applied Power Electronics Conference and Exposition (APEC), 2013 Twenty-Eighth Annual IEEE* , vol., no., pp.3151,3159, 17-21 March 2013
- Donnal, J.**; Schantz, C.; Orji, U., et. al. "VAMPIRE: Accessing a Life-Blood of Information for Maintenance and Damage Assessment," *American Society of Naval Engineers Day*, February 2012

## Invited Papers

- Lindahl, P., Bredariol, G., **Donnal, J.** and Leeb, S. "Noncontact electrical system monitoring on a U.S. Coast Guard cutter," in *IEEE Instrumentation & Measurement Magazine*, vol. 20, no. 4, pp. 11-20, August 2017.