# Nathan Weise

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## Employment

**Assistant Professor** — **Milwaukee, WI**
*Marquette University* — *August 2014 to Present*
Department of Electrical and Computer Engineering

**Assistant Professor** — **Orono, ME**
*University of Maine* — *Sept. 2011 to June 2014*
Department of Electrical and Computer Engineering

**Graduate Research Intern** — **Niskayuna, New York**
*GE Global Research* — *Jun. 2010 to Sept. 2010*
Characterized Hybrid SiC IGBTs, Characterized Highly Interdigitated Silicon Carbide Thyristors, and worked on state of the art MRI Gradient Drivers

**Electrical Engineer** — **Fridley, MN**
*Cummins Power Generation* — *2006 to 2007*
Controls and Electrical Engineering Systems Design

## Education

**University of Minnesota** — **Minneapolis, MN**
*Ph.D. in Electrical Engineering* — *Jan. 2008 to Aug. 2011*
Dissertation: Universal Utility Interface for Plug-in Hybrid Electric Vehicles with Vehicle-to-Grid Functionality
Advisor: Ned Mohan

**University of Minnesota** — **Minneapolis, MN**
*M.Sc. in Electrical Engineering* — *Sept. 2005 to Dec. 2007*
Thesis Project: 2.4GHz Low Noise Amplifier and Wilkinson Power Divider
Advisor: Rhonda Franklin

**University of Minnesota** — **Minneapolis, MN**
*B.Sc. in Computer Engineering* — *Sept. 2001 to May 2005*

## Teaching Experience

**Instructor** — **Marquette University**
*ELEN 4290/EECE 5290 Control of Energy Systems* — *Fall 2017*
3 credits, two 1 hour 15 minute lectures per week, new class, produced all new material, 7 students

**Instructor** — **Marquette University**
*EECE 2010 Circuits 1* — *Fall 2017*
3 credits, three 50 minute lectures per week, 87 students

**Instructor** — **Marquette University**
*ELEN 4220/EECE 5220 Power Electronics for Renewable Energy Systems* — *Spring 2017*
3 credits, two 1 hour 15 minute lectures per week and one 1 hour lab per week

**Instructor** — **Marquette University**
*EECE 2010 Circuits 2* — *Spring 2017*
3 credits, three 50 minute lectures per week

**Instructor** — **Marquette University**
*ELEN 4230/EECE 5230 Renewable and Legacy Electric Energy Systems Analysis* — *Fall 2016*

3 credits, two 75 minute lectures per week

**Instructor** **Marquette University**
*EECE 2010 Circuits 1* *Fall 2016*
3 credits, three 50 minute lectures per week

**Instructor** **Marquette University**
*ELEN 4220/EECE 5220 Power Electronics for Renewable Energy Systems* *Spring 2016*
3 credits, two 1 hour 15 minute lectures per week and one 1 hour lab per week

**Instructor** **Marquette University**
*ELEN/COEN 2020 Circuits 2* *Spring 2016*
3 credits, three 50 minute lectures per week

**Instructor** **Marquette University**
*EECE 6932 Advanced Power Electronics* *Fall 2015*
3 credits, two 75 minute lectures per week

**Instructor** **Marquette University**
*EECE 2010 Circuits 1* *Fall 2015*
3 credits, three 50 minute lectures per week

**Instructor** **Marquette University**
*ELEN 4220/EECE 5220 Power Electronics for Renewable Energy Systems* *Spring 2015*
3 credits, two 1 hour 15 minute lectures per week and one 1 hour lab per week

**Instructor** **Marquette University**
*ELEN 4230/EECE 5230 Renewable and Legacy Electric Energy Systems Analysis* *Fall 2014*
3 credits, two 1 hour 15 minute lectures per week
– New Course. Fully designed the course: lecture notes, simulations, homeworks, midterms tests, and final exam.

**Instructor** **University of Maine**
*ECE 450 Power Electronics* *Spring 2012, Spring 2013*
3 credits, three 1 hour lectures per week
– New Course. Fully designed the course: lecture notes, simulations, homeworks, midterms tests, and final exam.

**Instructor** **University of Maine**
*ECE 451 Power Electronics Lab* *Spring 2012, Spring 2013*
1 credit, one 2 hour lab session ever other week
– New Course. Designed lab experiments and lab reports.

**Instructor** **University of Maine**
*ECE 455 Electric Drives* *Fall 2012, Fall 2013*
3 credits, three 1 hour lectures per week
– New Course. Fully designed the course: lecture notes, simulations, homeworks, midterms tests, and final exam.

**Instructor** **University of Maine**
*ECE 451 Electric Drives Lab* *Fall 2012, Fall 2013*
1 credit, one 2 hour lab session ever other week
– New Course. Designed lab experiments and lab reports.

**Instructor** **University of Maine**
*INT 489 Renewable Energy Engineering* *Spring 2013*
3 credits, two 1.5 hour lectures per week
– New Course. Fully designed course material and assessments.
– Arranged multiple faculty to present their expertise in the field of renewable energy.

**Teaching Assistant** **University of Minnesota**
*EE4701 Electric Drives* *Fall 2009*
4 credits, three 1 hour lectures per week and one 2 hour lab every other week
– Redesigned experiments and lab manual to better suit students needs.
– Designed course homework problems, online learning modules, and exam problems.

**Teaching Assistant** **University of Minnesota**
*EE3101 Circuits Lab* *Fall 2008*

2 credits, one 2 hour lab per week
- Organized and coordinated lab proceedings.
- Developed new learning vessels, quizzes, and supplemental material.

**Teaching Assistant** **University of Minnesota**
*EE2361 Microcontrollers Lab* *Fall 2007*
4 credits, one 2 hour lab per week plus three 1 hour lectures per week
- Created new labs with key learning concepts and applied these concepts to current applications.

## Professional Service and Activities

**Department of Energy Wave Energy Prize Finalist - Team RTI**
Electrical Engineer Team Lead
Lead Design of control system, power conversion system, electric drive, and data acquisition system.

**Professional Society Memberships**
- *Member,* IEEE Power Electronics Society (PES), 2010-Present
- *Member,* IEEE Industrial Electronics Society (IES), 2010-Present
- *Member,* IEEE Vehicular Technology Society (VTS), 2010-Present
- *Member,* IEEE Power and Energy Society (PES), 2010-Present

**Peer Review Service**
- *Book Reviewer,* Power Electronics: A First Course, Wiley
- *Book Reviewer,* Electric Machines and Drives: A First Course, Wiley
- *Reviewer,* IEEE Transactions on Power Electronics, 2011 - Present
- *Reviewer,* IEEE Transactions on Industrial Electronics, 2011 - Present
- *Reviewer,* IEEE Applied Power Electronics Conference and Exposition, 2011 - Present
- *Reviewer,* IEEE Energy Conversion Congress and Exposition, 2011 - Present
- *Reviewer,* IEEE Transportation Electrification Conference and Exposition, 2011 - Present
- *Reviewer,* IEEE Transactions on Sustainable Energy, 2014 - Present

**Conferences and Meetings Attended**
- *Participant, Presenter* IEEE International Electric Machines and Drives Conference, Miami, FL, May. 21-24, 2017.
- *Participant,* M-WERC TI 2.0 Symposium, Wauwatosa, WI, Apr. 11, 2017.
- *Topic Chair, Session Chair, Presenter,* Energy Conversion Congress and Expo, Milwaukee, WI, Sept. 18-22, 2016.
- *Session Chair, Presenter,* Applied Power Electronics Conference and Exposition, Long Beach, CA, Mar. 20-24, 2016.
- *Session Chair, Presenter,* Energy Conversion Congress and Expo, Montreal, CAN, Sept. 20-24, 2015.
- *Participant,* M-WERC Open Meeting, Milwaukee, WI, Mar. 25, 2015.
- *Session Chair,* Applied Power Electronics Conference and Exposition, Charlotte, NC, Mar. 15-19, 2015.
- *Participant,* Reforming Electric Energy Systems Curriculum, Minneapolis, MN, Oct. 4-5, 2014.
- *Session Chair,* Applied Power Electronics Conference and Exposition, Dallas, TX, Mar. 16-20, 2014.
- *Presenter,* IEEE PES General Meeting, Vancouver, BC, Jul. 21-25, 2013.
- *Participant,* Electric Energy Systems Curriculum for Sustainability Workshop, Napa, CA, Feb. 7-9, 2013.
- *Participant,* Energy Conversion Congress and Exposition, Raleigh, NC, Sep. 15-20, 2012.
- *Presenter,* IEEE Vehicle Power and Propulsion Conference Chicago, IL, Sep. 6-9, 2011.
- *Participant,* SMART GRID Consumer and Utility Perspectives, Orono, ME, 2011.
- *Presenter,* Reforming the Electric Energy Systems Curriculum, Tuscon, AZ, 2010.
- *Presenter,* The Initiative for Renewable Energy and the Environment E3, St Paul, MN, 2009.
- *Presenter,* Reforming the Electric Energy Systems Curriculum, Corvallis, OR, 2009.
- *Presenter,* Reforming the Electric Energy Systems Curriculum, Napa, CA, 2009.

## Grants

**Advanced Parallel Resonant 1MHz, 1MW, Three Phase AC to DC Ultra Fast EV Charger**
*Department of Energy (DOE) Advanced Research Project Agency (ARPA-E) CIRCUITS* *2018*
$665,734

**Pre-Tenure Research and Creative Activity Fellowship**
*Ocean Wave Energy Harvesting* *2013*
$25,000

**Efficiency of Maine**
*Energy Efficiency Innovation* *2012–2013*
$28,155

**UMaine Curriculum Fee 2012**
*PCB Fabrication Center for Undergraduate Education* *2012*
$26,000

**UMaine CETA Active Learning Grant 2011**
*Electric Drive Inverter for Undergraduate Education Lab* *2011*
$1,000

**Initiative for Renewable Energy & the Environment Seed Grant**
*Universal Utility Interface for Plug-in Hybrid Electric Vehicles with Vehicle-to-Grid Functionality* *2009*
$70,527

## Journal Papers

[J7] R. Katebi, J. He, and N. Weise, "Advanced three-level active neutral-point clamped converter with improved fault-tolerant capabilities," *IEEE Trans. Power Electron.*, 2017.

[J6] J. He, R. Katebi, and N. Weise, "A current-dependent switching strategy for si/sic hybrid switch-based power converters," *IEEE Trans. Ind. Electron.*, vol. 64, no. 10, pp. 8344–8352, Oct. 2017.

[J5] D. Varajão, R. E. Araújo, L. M. Miranda, J. P. Lopes, and N. D. Weise, "Control of an isolated single-phase bidirectional ac-dc matrix converter for V2G applications," *Electric Power Systems Research*, vol. 149, pp. 19–29, 2017.

[J4] J. He, N. A. Demerdash, N. Weise, and R. Katebi, "A fast on-line diagnostic method for open-circuit switch faults in sic-mosfet based t-type multilevel inverters," *IEEE Trans. Ind. Appl.*, vol. 53, no. 3, pp. 2948–2958, May 2017.

[J3] J. He, N. Weise, R. Katebi, N. A. Demerdash, and L. Wei, "A fault-tolerant t-type multilevel inverter topology with increased overload capability and soft-switching characteristics," *IEEE Trans. Ind. Appl.*, vol. 53, no. 3, pp. 2826–2839, May 2017.

[J2] A. Sproul and N. Weise, "Analysis of a wave front parallel wec prototype," *IEEE Transactions on Sustainable Energy*, vol. 6, no. 4, pp. 1183–1189, Oct. 2015.

[J1] N. Weise, K. Basu, G. Castelino, and N. Mohan, "A single-stage dual active bridge based soft switched ac-dc converter with open-loop power factor correction and other advanced features," *IEEE Trans. Power Electron.*, vol. 29, no. 8, pp. 4007–4016, Aug. 2014.

## Conference Papers

[C15] J. He, H. Chen, R. Katebi, N. Weise, and N. A. O. Demerdash, "Mitigation of uneven surge voltage stress on stator windings of induction motors fed by sic-mosfet-based adjustable speed drives," in *Proc. IEEE International Electric Machines and Drives Conference (IEMDC)*, May 2017, pp. 1–7.

[C14] J. Rohrer, N. Weise, T. Dewhurst, and M. Macnicoll, "Testing and modelling the rti f2 qd wec," in *European Wave and Tidal Energy Conference (EWTEC)*, Aug. 2017.

[C13] J. He, N. Weise, L. Wei, and N. A. O. Demerdash, "A fault-tolerant topology of t-type npc inverter with increased thermal overload capability," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Sep. 2016.

[C12] J. He, N. Weise, R. Katebi, L. Wei, and N. Demerdash, "A fault-tolerant t-type multilevel inverter topology with soft-switching capability based on si and sic hybrid phase legs," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, Sep. 2016, pp. 1–7.

[C11] R. Katebi, A. Stark, J. He, and N. Weise, "Advanced three level active neutral point converter with fault tolerant capabilities," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, Sep. 2016, pp. 1–7.

[C10] A. Andhra and N. Weise, "Bidirectional sic three-phase ac-dc converter with dq current control," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, Sep. 2015.

[C9] A. Andhra and N. Weise, "Dc ripple current rejection in a bidirectional sic single-phase ac-dc converter for v2g application," in *Proc. IEEE Transportation Electrification Conference and Expo (ITEC)*, Jun. 2015.

[C8] A. Andhra and N. Weise, "Implementation and validation of dq current control of a bidirectional sic single-phase ac-dc converter," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Mar. 2015.

[C7] L. Doiron and N. Weise, "Dq current control of a bidirectional, isolated single-stage ac-dc converter," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Mar. 2014.

[C6] N. Weise, "Dq current control of a bidirectional, isolated, single-stage ac-dc converter for vehicle-to-grid applications," in *Proc. IEEE Power and Energy Society General Meeting July 21-25*, 2013.

[C5] N. Reimensnyder and N. Weise, "Voltage control of a single phase, single-stage, isolated ac-dc converter," in *Proc. IEEE Transportation Electrification Conference and Expo, June 16-19*, 2013.

[C4] G. Castelino, K. Basu, N. Weise, and N. Mohan, "A bi-directional, isolated, single-stage, dab-based ac-dc converter with open-loop power factor correction and other advanced features," in *Proc. IEEE International Conference on Industrial Technology (ICIT'12)*, Mar. 2012, pp. 938–943.

[C3] N. Weise, K. Basu, and N. Mohan, "Advanced modulation strategy for a three-phase ac-dc dual active bridge for v2g," in *Proc. IEEE Vehicle Power and Propulsion Conference (VPPC'11)*, Sep. 2011, pp. 1–6.

[C2] N. Weise, K. Mohapatra, and N. Mohan, "Reducing harmonics in bidirectional utility interface for plugin hybrid electric vehicles," in *in Proc. Grand Challenges in Modeling and Simulation*, Jul. 2010.

[C1] N. Weise, K. Mohapatra, and N. Mohan, "Universal utility interface for plug-in hybrid electric vehicles with vehicle-to-grid functionality," in *Proc. IEEE Power and Energy Society General Meeting*, Jul. 2010, pp. 1–8.

## Patents

- Jiangbiao He, Lixiang Wei, Nathan Weise, and Nabeel A.O. Demerdash, "A Novel Fault-Tolerant Topology for Multilevel NPC Converters with Improved Overload Capability," Provisional Application No. 62/255,075, 2016.
- R. Gupta, K. Mohapatra, N. Mohan, G. Castelino, K. Basu, N. Weise, "Soft Switching Power Electronic Transformer," U.S. Patent: 8,446,743 B2, issued date May 21, 2013.

## Advisees

### Doctoral

[3] Waqar Khan

[2] Ramin Katebi

[1] Jiangbiao He, Graduated May 2016, Marquette University

### Masters

[3] Arjun Andhra, Graduated May 2015, Marquette University

[2] Asa Sproul, Graduated May 2015, University of Maine

[1] Nathan Reimensynder

### Undergraduate

[6] Anin Maskay
[5] Brandon Dupuis
[4] Tony Nuzzo
[3] David Hart
[2] Lance Doiron
[1] Lonnie Labonte

### Senior Design Teams

[2] Jonathan Tripi, James Schroder, Zac Crites, Calvin Lei, "Team E57: Power Aggregator Wall", Sponsored by Briggs & Stratton Corporation, Fall 2016 - Spring 2017

[1] Brian Axen, Calvin Jay, Lucas Rutowski, Matt Latin, Nick Post, "Team E60: Vintage Tube Amplifier ", Fall 2015 - Spring 2016

## Graduate Student Committee Member

### Doctoral Students

- Amamihe Onwuachumba
- Aseem Rambani
- Yunhui Wu

### Masters Students

- Micheal Macinoli
- Chad Somogyi

### Honors Undergraduate Students

- Brendan Gates

## Service

Service outside my discipline

- Volunteer Foster Parent Bangor Humane Society
- Habitat For Humanity - Built new homes in Jacksonville Beach, Florida