

October 25, 2022

Shonta Dunston
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

Re: NC GreenPower Board Appointments, Docket No. E-100 Sub 90

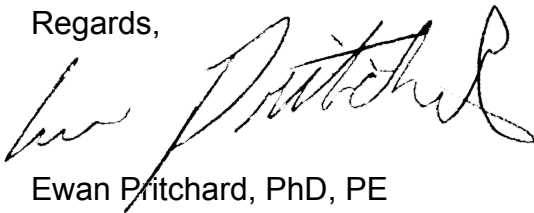
Dear Ms. Jarvis,

I have been pleased with my abilities to serve on the NC GreenPower Board of Directors in the Unspecified Technology seat. As such, I would like to offer to continue (re-nominate myself) in my role on this board. I feel I have been able to significantly contribute to the positive growth of the organization and serve the rate payers of North Carolina well in this role due to my extensive knowledge of renewable energy and traditional energy systems.

I have also included a brief resume which highlights my work internationally with Energetics as well as my own engineering firm, engineering and designing renewable microgrids internationally with large industrial clients.

Please do not hesitate to contact me should you have any questions at the contact information in the header of this letter.

Regards,

A handwritten signature in black ink, appearing to read 'Ewan Pritchard', written in a cursive style.

Ewan Pritchard, PhD, PE
Engineering Consultant
Pritchard Engineering

Enclosure: Ewan Pritchard - Resume 20190724.pdf (7 pages)

EWAN G. D. PRITCHARD, Ph.D., P.E.

323 North Salem Street, Apex, NC 27502 | 919.819.0098 | ewan@pritchardeng.com

ENGINEERING DIRECTOR

Mechanical Engineering | Procedural Design | Product Development | Strategic Planning | R&D

Innovative Mechanical Engineer and Senior Organizational Leader offering expertise in research and development, procedural design, strategic planning, electric vehicle design, microgrid design, competitive intelligence and quality control. **Recognized as an outstanding team builder/leader** having the capability to initiate change and deliver technical information to general audiences. **Engage in strategic planning** to meet the evolving needs of customers, leading major programs and critical technical initiatives. **Analyze the marketplace** to determine competitor offerings/developments and develop new growth opportunities. **Drive innovation from idea generation to product launch**, offer a market-focused mindset, quickly resolve issues, anticipate changes in customer needs, maintain effective management within complex projects, and make timely decisions.

AREAS OF EXPERTISE

Electric Vehicle Design ♦ Microgrid Design ♦ Team Leadership/Training ♦ Technical Communication ♦ Research/Analysis
Problem Solving ♦ Change Management ♦ Competitive Intelligence ♦ Business Development ♦ Technical Challenges
Customer Relations ♦ Continuous Improvement ♦ Innovation ♦ Global Operations ♦ Idea Generation ♦ Resource Allocation

PROFESSIONAL HISTORY

Energetics International, Baltimore, MD

Feb. 2020 to Present

SUBJECT MATTER EXPERT

Providing leading expert analysis and leadership around electric transportation programs for Governments, Electric Utilities, and Large Fleet Owner/Operators.

- *Provided leadership for the analysis team of the EV WATTS program collecting, synthesizing, and analyzing data for over 40,000 electric vehicle charging ports and nearly 1,000 vehicles across the United States for delivery to DOE and the National Labs.*
- *Developed analysis for third party evaluation of the California Electric Utilities Priority Review Programs (PRP). A collection of 22 multi-million dollar projects which delivered electric vehicles and infrastructure to key markets across California.*
- *Performed a full CAPEX and OPEX for a \$1B+ electric vehicle and infrastructure plan for a major middle east developer*
- *Leading the vehicle and charging equipment data collection and analysis for the California Senate Bill 350 Standard Review Program, a six year program to collect and evaluate data from vehicles and charging units across the State of California.*
- *Leading consulting efforts with a major international school bus contractor in establishing a strategy to completely decarbonize their 40,000+ vehicle fleet*

Pritchard Engineering, Apex, NC

Jun. 2018 to Present

OWNER AND ENGINEERING CONSULTANT

Foundation and operation of an independent engineering consulting firm specializing in microgrids, renewable energy, energy efficiency, electric drive vehicles and dc driven electric systems. Primary client base includes the design of electric drive vehicles, microgrids, organizational design standard practices, failure analysis, engineering "depth" expert for several organizations unable to keep such expertise on board full time.

Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC

SENIOR LECTURER

Jan. 2018 to Jun. 2018

Teach undergraduate coursework and manage the Advanced Transportation Energy Laboratory while developing new work and partnerships for the University.

- *Develop and teach Automotive Model Based Design course.*
- *Teach and develop corporate partnerships for senior design projects.*
- *Manage the Advanced Transportation Energy Laboratory.*
- *Serve as faculty Advisor for SolarPack, the University's first solar vehicle team.*
- *Lead CREDENCE, a multi-million dollar, three year NSF funded research collaborative focused on Energy in the US, Ireland, and Northern Ireland.*

Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center, North Carolina State University, Raleigh, NC
ASSOCIATE DIRECTOR **2012 to Dec. 2017**

Strive to develop educational programs and cutting-edge research for decentralizing electricity distribution with an initiative to overcome distribution challenges, and moving to smaller distribution models, even in the face of resistance from electrical utility companies. Develop technology to allow for the bi-directional flow of electricity, and allowing the consumer to connect to renewable energy sources through new delivery methods.

- Collaborated on a team of 200+ researchers, building a major portion of the team and working within \$40MM in funding.
- Acquired 40 corporate electricity partners, including ABB, Schneider, Eaton, Link, Southern California Edison and an array of smaller companies.
- Facilitated, developed and proposed large, multi-research, multi-disciplinary proposals such as DOE PowerAmerica and the NSF Collaborative Research of Decentralization, Electrification, Communications and Economics (CREDENCE) center-to-center collaboration with Ireland and Northern Ireland.
- Lead annual reporting efforts to the NSF and center membership via the annual conference.
- Serve as the executive editor for the center annual report generally exceeding 1K pages.
- Manage communications and operations for 200 to 300 researchers, and guide the overall vision for the center.
- Direct relationships and reviews with the Scientific Advisory Board, and build program partners to expand the research and funding profile.
- Establish and set up center facilities, including user agreements and funding plans, and create/develop business sustainability plans while securing long-term funding through strategic partnerships with industry members and academic partners in government agencies.
- Set a long-term center vision for sustainability beyond seed funding.
- Direct operations at all FREEDM laboratories, including overseeing the lab manager and establishing safety procedures.
- Engage in extensive public relations initiatives.
- Played a key role in the largest grant ever secured by NC State University, a \$146MM grant for creating PowerAmerica in 2014 to work with manufacturers of power semi-conductors to create required tools to transform the industry, and filling a gap in manufacturing by creating an institute to build semi-conductors through a manufacturing partnership with CREE, X-FAB and United Silicon Carbide.

Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center, North Carolina State University, Raleigh, NC
DIRECTOR OF INDUSTRY, COLLABORATION AND INNOVATION **2010 to 2012**

Led and secured 30 to 50 industrial members of the center, building the portfolio of work with 200+ faculty and researchers, and spinning off 10 companies in addition to leading, recruiting and generating feedback and input from the Industrial Advisory Board.

- Presented to the National Science Foundation on the industry and innovation programs within the center.
- Collaborated with industrial members, center faculty, students and staff to develop innovation programs and quickly introduce concepts to programs and then products.
- Hired and managed the center's Industry Director.

Advanced Transportation Energy Center (ATEC), North Carolina State University, Raleigh, NC

ASSOCIATE DIRECTOR

2009 to 2012

Served as the FREEDM Systems Center Plug-In Hybrid (PHEV) and Plug-In Electric Vehicle (PEV) test bed leader for the NSF funded Engineering Research Center. Managed the proposal and implementation of center grant programs.

- Acted as the industrial liaison between automotive members of the ATEC and center researchers.
- Engaged in system-level vehicle modeling research on behalf of the center, and served as a guest lecturer on vehicle related matters while managing the image of the ATEC within the research and vehicle community.
- Collaborated with center directors to manage funding and workloads.

*"Ewan is an exceptional engineer, scientist and teacher. He delivers above and beyond expectations every time."
 --CEO, Positive Energy (client)*

Advanced Energy, Raleigh, NC

HYBRID PROGRAM MANAGER

2002 to 2008

Expertly investigated the technical benefits and feasibility of plug-in hybrid technology for school buses. Recognized as an industry leader in plug-in hybrid technology.

- Developed the Plug-In Hybrid School Bus Program at the corporation, securing \$4MM in grants and funding for the purchase of up to 20 plug-in hybrid school buses.
- Negotiated the contract and purchase of plug-in hybrid school buses from International Truck and Engine.
- Gathered a group of potential purchasers, the Hybrid School Bus Buyers Consortium, pooling over 10% of North American demand for school buses, and working to build a national purchase.

EARLY CAREER SUMMARY

NC GREENPOWER RESOURCE MANAGER, Advanced Energy, Raleigh, NC
ENERGY CONSULTANT / TRAINER, Advanced Energy, Raleigh, NC

EDUCATION AND PROFESSIONAL DEVELOPMENT

PH.D. – MECHANICAL ENGINEERING, North Carolina State University, Raleigh, NC
Dissertation: "Torque Converter Interactions in a Parallel Post Transmission Hybrid Driveline"
MASTER OF SCIENCE – MECHANICAL ENGINEERING, North Carolina State University, Raleigh, NC
Thesis: "Performance Modeling of Hybrid and Plug-In Hybrid Electric School Buses using ADVISOR"
BACHELOR OF SCIENCE – MECHANICAL ENGINEERING, North Carolina State University, Raleigh, NC
Focus: Thermal and Energy Systems

GRANTS AND AWARDS

NSF Center to Center Collaboration "Collaborative Research of Decentralization, Electrification, Communications and Economics (CREDENCE)". CREDENCE is an \$875K, three-year research effort initiated in September 2016. The origination of funding was the result of a visit to Ireland at the request of the NSF Director, and presenting to centers and industry in Ireland on the mission of FREEDM and activities in the US. Trip results built an interest to secure a small amount of funding from NSF to host a "Trilateral Energy Summit" with Industry and Academia represented from across the US, Ireland and Northern Ireland. The summit then resulted in an identified need for a roadmap to move from centralized controlled utility grids to more distributed controls and generation alongside of electrification of traditionally combustion based uses. The roadmap is highly affected by policy and economics, and by communication and cybersecurity mechanisms. As a result, a sub-team of the workshop proposed and secured the CREDENCE effort, which uses a multidisciplinary approach to create the roadmap in a three-year research effort.

USTDA/Positive Energies "Microgrid Design Study for US Export Development to the Dominican Republic". The modular electric generator or MEG program was funded through industry funding in collaboration with FREEDM member Positive Energies. The overall two-year project cost was \$322K and began in June 2015. In this project, a modular unit for DC microgrid use in the Dominican Republic was developed utilizing model based design methodologies from the automotive industry with the resulting system then used to develop a control system, which was implemented in the prototype units built by Schneider Electric.

US DOE "PowerAmerica: The Next Generation Power Electronics Manufacturing Innovation Institute". Based on the expertise at NC State and the need for lower cost, wide bandgap power electronics components for prototyping new designs, a small team of faculty worked collaboratively through the Summer of 2014 to secure the \$146MM grant awarded in December 2014. Specifically, for this proposal, served as one of the proposing investigators and managed the entire budget and the industry collaboration along with a number of major parts of the proposal, and served in an editorial capacity in other areas. Facilitated working with outside vendors to develop graphics to more effectively communicate the concepts.

American Public Power Association "Vehicle Energy Storage & Solar Demonstration". This \$48K award in July 2012 provided much needed funds to place solar panels in a visible location along with an interactive touchscreen display to demonstrate the tie between solar power, vehicle charging and the remaining facilities at the FREEDM Systems Center.

US DOE/Duke Energy "Fast Charging Demonstration and Parking Deck Control Architecture". This DOE Award was the result of collaboration with Duke Energy and EPRI in the amount of \$344,771 in April 2011. This funding allowed FREEDM to install the first DC vehicle fast charger on the East Coast, and established a relationship with General Motors on the fast-charging of electric vehicles.

US DOE/Celgard "Battery Separators Containing Electrospun Nanofibers". This \$499K was a joint collaboration funded in March 2010 with Dr. Xiangwu Zhang in the NC State College of Textiles to develop and understand the possibility of using electrospun nanofibers to increase the wettability of separators and improve overall performance.

State of NC/Duke Energy/Progress Energy "Advanced Transportation Energy Center". A \$5MM joint effort between the State of NC, Progress Energy and Duke Energy funded June 2008 to establish a center of excellence at NC State in automotive research. Spearheaded the effort from Advanced Energy with Progress Energy to create ATEC and increase the level of Electric Vehicle work ongoing in North Carolina. Ultimately the funding was awarded to NC State University to be administered by Dr. Alex Huang, the Director of the FREEDM Systems Center.

NASEO "Plug-In Hybrid School Bus Demonstration and Deployment". This \$1.9MM in funding was awarded in June 2005 to support the purchase of up to 20 plug-in hybrid school buses from the National Association of State Energy Offices (NASEO). The funding was the culmination of deep research into the feasibility of the plug-in hybrid school buses and the consortium of school bus purchasers assembled ready and willing to purchase such buses.

FACILITIES AND LABS

Modular Electric Generator – Worked with industry partners, Positive Energies and Schneider, to develop a modular container product (four can be placed inside of a standard shipping container) for instant dc microgrids. The solution used model based design to develop a battery, natural gas generator, and power electronics approach to provide grid-connected (or off-grid) microgrids where electric power is unreliable. The solution allows the interconnection of up to four different intermittent renewable resources to be ganged together and provide power that is more reliable. The program now has four beta testing units deployed for testing.

Vehicle Chassis Dynamometer Facility – Negotiated the purchase of a used chassis dynamometer and vehicle test platform for electric vehicle development. Worked with university officials in four collaborating departments to fund and install the dynamometer and the remodel of a previously defunct lab at NC State University. Worked with a post-doctoral researcher to develop a new National Instruments LabView based operating system and calibration routine, the new lab now called the Advanced Transportation Energy Laboratory (ATEL) at NC State University.

Vehicle Energy Storage and Solar Demonstration (VESSD) – Worked through the American Public Power Association (APPA), an electric municipality trade organization to secure a grant to fund the development and construction of an interactive solar array, vehicle charging stations and touch screen display to promote FREEDM Systems Center developments.

FREEDM Systems Green Energy Hub – Primary interface with building developers, equipment vendors, university officials and faculty members for the development of the 1MW FREEDM Green Energy Hub. This system included five 12kV test nodes with PT and CT data collection points, a 40 kW solar array and inverter and up to 10 vehicle charging stations.

Electric Motor Test Lab Manager – Replaced and reprogrammed older Pascal-based test programs and failing computer systems with LabView Operating Systems and National Instruments hardware. Assembled all equipment and developed in-house software for PID control of voltage on three phases, test data collection and reporting, and calibration. Developed numerous test rigs for testing of electric motors such as a high speed multi-level flywheel, a fractional horsepower test platform with precise failure mode using glass rod, and a 10-station motor cycling test rig with intermittent waterjets to decrease cycle time.

Process Heating Lab Manager – Maintained and managed Advanced Energy's process heating laboratories including developing test plans, developing and designing new equipment, and maintaining and calibrating existing equipment. Equipment included infrared and radio frequency ovens, production scale powder coating process line, induction furnaces and UV curing operations. Measurement equipment included thermocouples and readers, fluoroptic temperature probes, voltage and current measurement, and data collectionsystems.

PUBLICATIONS AND PUBLICITY

PUBLICATIONS

- **E. Pritchard**, L. Mackey, D. Gregory, "Modular Electric Generator Rapid Deployment DC Microgrid," 2017 IEEE Second International Conference on DC Microgrids (ICDCM), June 2017
- D. Zhu, **E. Pritchard**, L. Silverberg "A New System Development Framework Driven by a Model-Based Testing Approach Bridged by Information Flow," IEEE Systems Journal, December 2016
- **E. Pritchard**, D. Gregory, S. Srdic, "The dc Revolution," IEEE Electrification Magazine, June 2016
- D. Zhu, **E. Pritchard**, "NCSU Year Three Final Technical Report," SAE 2014 International Powertrain, Fuels & Lubricants Meeting, October, 2014
- **E. Pritchard**, R. Johnson, R. Gould, "A Fluid Model Extension of the Torque Converter into the Overrunning Regime," SAE 2014 World Congress & Exhibition; Detroit, Michigan, April 2014
- J. F. Lawrence, E. Klang, **E. Pritchard**, "Torque Converter Predictive Modeling Validation in a Post Transmission Parallel Hybrid Drive Train," NCSU ETD, December 2012
- **E. Pritchard**, R. Johnson, R. Gould, "Torque Converter Interactions in a Parallel Post Transmission Hybrid Driveline," IEEE Vehicle Power and Propulsion Conference; Chicago, Illinois, September 2011
- S. Sadiq, A. Emadi, **E. Pritchard**, "Plug-In Hybrid Market Transformation by Leveraging a Niche Market: School Buses," IEEE Vehicle Power and Propulsion Conference; Arlington, Texas, September 2007
- **E. Pritchard**, R. Johnson, "Technical Performance Modeling of Hybrid and Plug-In Hybrid Electric School Buses Using ADVISOR," IMECE2005-79530, International Mechanical Engineering Conference & Exhibition; Orlando, Florida, November 2005
- **E. Pritchard**, R. Johnson, "Hybrid Electric School Bus Technical Feasibility," 05CV9, SAE Commercial Vehicle Exhibition; Chicago, Illinois, November 2005
- **E. Pritchard**, B. Zickefoose, K. Dulaney, "Hybrid Electric School Bus Preliminary Business Feasibility", Advanced Energy, June 2005
- **E. Pritchard**, "Performance Modeling of Hybrid and Plug-In Hybrid Electric School Buses using ADVISOR", NCSU ETD, April 2004

PUBLICITY

- B. Schrader, "NCSU leads the charge for plug-in cars", WRAL September 2013 <http://www.wral.com/ncsu-leads-the-charge-for-plug-in-cars/12859789/>
- D. Wax, "A Case for the Smart Grid", Appalachian Voices, April 2013 <http://appvoices.org/2013/04/16/a-case-for-the-smart-grid/>
- A. Nimocks, F. Stasio, "It's Electric", The State of Things, WUNC, June 2011 <http://wunc.org/post/its-electric>
- B. Geary, "How the Electric Car will Save Us", Indy Week, July 2010 <http://www.indyweek.com/indyweek/how-the-electric-car-will-save-us/Content?oid=1520228>
- T. Grose, "Mechanical Engineering is on the Rise", US News and World Report, March 2008 <http://www.usnews.com/education/articles/2008/03/26/mechanical-engineering-is-on-the-rise>
- Ron Barnett, "States Test Drive Hybrid School Buses", USA Today, November 2007 http://usatoday30.usatoday.com/news/nation/2007-11-14-hybridbus_N.htm
- Mark Clayton, "The Basic Yellow School Bus Turns Green", USA Today, April 2007 http://usatoday30.usatoday.com/tech/news/techinnovations/2007-04-01-hybrid-buses_N.htm

INVITED TALKS AND TUTORIALS

- **E. Pritchard**, "Electric School Bus Experiences" and "Infrastructure 101" Invited Speaker, 2021 STN Green Bus Summit; Virtual, April 2021
- **E. Pritchard**, "2015 Smart Grid Trends in the US" UK Consulate Invited Speaker, 2015 UK- China-US Smart Grid Workshop; Birmingham, UK, September 2015
- **E. Pritchard**, "Current Trends in the Energy Marketplace" Invited Keynote, Science Boot Camp for Librarians Conference; Raleigh, NC, July 2014
- **E. Pritchard**, "History of the Electric Vehicle" Invited Speaker, Apex Founders Festival, February 2014
- **E. Pritchard**, "Grid Innovation at the FREEDM Systems Center" US Consulate Guest, US- Mexico Smart Grid Technology & Business Forum, Mexico City, Mexico, March 2013
- **E. Pritchard**, "Smart Grid, Smarter Grid" Invited Speaker, Siemens Solar Exchange East; Raleigh, NC, September 2011
- **E. Pritchard**, "Smart Grid, Smarter Grid" Invited Speaker, North Carolina Smart Grid Leadership Forum; Chapel Hill, NC, August 2011
- **E. Pritchard**, "Wheels in Motion: The promise of Plug-In Hybrid Vehicles," Invited Speaker, Alternate Fuels and Vehicles 2009; Orlando, Florida, April 2009
- **E. Pritchard**, "Heavy Duty Plug-In Programs," Invited Speaker, Plug-In 2008; San Jose, California, July 2008
- **E. Pritchard**, "The Marketplace for Plug-In Hybrid Vehicles," Invited Speaker, Alternate Fuel Vehicle Institute; Las Vegas, Nevada, May 2008
- **E. Pritchard**, "Plug-In Hybrid School Bus Performance," Invited Speaker, Power-Up Conference; Wenatchee, Washington, May 2008
- **E. Pritchard**, "Plug-In Hybrid Market Transformation," Invited Speaker, EVS 23; Anaheim, California, December 2007
- **E. Pritchard**, "PHEV's, How to Transform a Marketplace," Keynote Speaker, PHEV-2007; Winnipeg, Canada, November 2007
- **E. Pritchard**, "Nationwide Hybrid Electric School Bus Commercialization," Invited Speaker, Transportation Research Board; Washington, DC, January 2005
- **E. Pritchard**, "Plug-In Hybrid Electric School Buses," Invited Speaker, DOE 21st Century Truck Group; Golden, CO, July 2004

ADVISORY**Ph.D.**

Landon Mackey, PhD EE, May 2019. "Protection Coordination of DC Distribution Systems". Co-advisor with Dr. Iqbal Husain (ECE)

Di Zhu, PhD ME, June 2017 "A New Design-Structure- Matrix Development Framework". in NCSU MAE. Co-advisor with Dr. Larry Silverberg (MAE)

Changjian Hu, PhD ME December 2014 "A Comprehensive Study of Control Methodology for Plug-in Hybrid Electric Vehicles" Advising support with Dr. Alex Huang (ECE)

MASTER OF SCIENCE

Jon Lohr, MS ME May 2014 - Committee Member, "Design of a Multi-Engine Test Stand with Eddy Current Dynamometer". Co-Advisor with Dr. Eric Klang (MAE)

Jason Markijohn, MS EE May 2013 –, Project Advisor "Design of Electric Vehicle Energy Storage System with Performance Analysis

Ewan G.D. Pritchard, Ph.D., P.E.

Using ADVISOR". Co-advisor with Dr. Iqbal Husain (ECE) *Matthew Frahm*, MS ME May 2013 - Committee Member, Mentor, "Electromagnetic

Interference Shielding Effectiveness of Composite Materials". Co-Advisor with Dr. Eric Klang (MAE)

Josh Lawrence, MS ME December 2012 - Committee Member, Mentor, Project Sponsor "Torque Converter Predictive Modeling Validation in a Post Transmission Parallel Hybrid Drive Train". Co-Advisor with Dr. Eric Klang (MAE)

Sriram Sankaran, MS ME, June 2012, "Retrofitting an Effective Air Conditioning System for a Hybrid Vehicle Conversion" Advising Support with Dr. Eric Klang (MAE)

UNDERGRADUATE AND RET

Bryon Spells, NCSU, Research Experience for Undergraduates (REU) Summer 2017, "NCSU SolarPack Vehicle Development Process through simulation and hardware-in-the-loop Testing"

Mariel Jeffris, NCSU, REU Summer 2017, "Transactive Energy and its effects on electrification and decentralization of electric energy"

Alexis Aguiere, UTEP, REU Summer 2017, "Open Access Renewable Energy Data Platform"

Stephen Hecht, WTCC, REU Summer 2017, "Development of an enhanced chassis dynamometer human-machine interface"

David Sander, Wake Forest High School, Research Experiences for Teachers (RET) Summer 2017, "GRIDc integration into IBM's Bluemix Cloud Computing Platform"

Valliappan Muthukaruppan, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Electrical Design"

Melissa Hyland, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design" *Arshpal Grewal*, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design" *Ethan Stoddard*, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design"

Benjamin Mechelke, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design" *Komal Charania*, NCSU, REU Summer 2017, "NCSU SolarPack Electrical Solar Car Design"

Abhinav Gundala, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design" *Jonathan Medju*, NCSU, REU Summer 2017, "NCSU SolarPack Electrical Solar Car Design" *Peter Markoff*, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design"

Esther Lee, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis and Powertrain Design"

Micah Ulrich, NCSU, REU Summer 2017, "NCSU SolarPack Electrical Solar Car Design"

Cody Biedermann, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design"

Grant Hierman, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design"

Alwin Mathew, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design"

M. Rachel Shalloway, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design" *Caroline Kirkland*, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Powertrain Design" *Bryan Oakley*, NCSU, REU Summer 2017, "NCSU SolarPack Electrical Solar Car Design"

Ziwei Liu, NCSU, REU Summer 2017, "NCSU SolarPack Electrical Solar Car Design"

Anwar Seid, NCSU, REU Summer 2017, "NCSU SolarPack Solar Car Chassis Design"

Benjamin Filpi, NCSU, Undergraduate Research Scholarship (UGRS), Fall 2016-Spring 2017, "Integration of Matrix DC Bus Inverter System with Schneider-Electric MCC and PLC"

Matthew Sonnenberg, NCSU, UGRS, Fall 2016-Spring 2017, "Microgrid Financial Modeling Tool"

Mark Heidenfeldt, NCSU, UGRS, Fall 2016-Spring 2017, "Hardware in the Loop (HIL) Wiring Harness: An Exploration of HIL Benefits"

Pre-2017 advising available upon request.

TEAMS AND CLUBS

NC State University SolarPack, Team Advisor, December 2016-Present. The NC State SolarPack is the University's first solar vehicle team. The team has successfully used model-based design to fully design their first vehicle. The vehicle is in the build phase 2017.

NC State University EcoCAR II, Co-Advisor with Dr. Eric Klang (MAE). The team completed three years of competition from Fall 2012 to Spring 2015. The resulting vehicle is a 50-mile series plug-in hybrid biodiesel (B-20) vehicle. The vehicle is now used for University promotion and as a calibrated test load for the Universities chassis dynamometer.

BOARDS AND ASSOCIATIONS

NC GreenPower, Spring 2015 - Present: New Technology Board Seat

This seat is a nominated position by appointment publicly announced and approved by the NC Utilities Commission. In late Fall 2014, appointed in for a two-year term in a competitive nomination process by the NC Utilities Commission. This term was then renewed for a second term by unanimous vote in Fall 2016. Worked alongside of C level utility executives and business leaders to guide the NC GreenPower Program. Served on both the Transition and the Solar Schools Selection SubCommittees. Serving as the board Vice-Chairman in 2020.

Apex Public Art Committee, Fall 2019-Present

Working with the town and committee members to install and promote public art installations within the Town of Apex, NC

Carolina Electric Vehicle Coalition, 2015-Present: Board Vice-President; 2008-2014: Board President

Guided the K-12 hands on engineering program called the EV Challenge. The program has worked for over 25 years to inspire kids to pursue a career in sustainable engineering.

Research Triangle Cleantech Cluster, 2016-2018: Advisory Board Member

Worked with the Research Triangle Regional Partnership and NC State University to found the RTCC in 2009 along with other local business and clean tech leaders.

American Society of Mechanical Engineers: Egg Drop Chairman - 2001

Eastern NC Section Chairman - 2000 Eastern NC Section Vice-Chairman - 1999 NCSU Student Chapter Chairman - 1996

NCSU Student Chapter Vice-Chairman - 1995 NCSU Student Chapter Programs Chairman – 1994