

## Wisconsin Electric Machines and Power Electronics Consortium

WEMPEC is an organization of sponsoring companies fostering innovation by supporting research and educational programs in electric machines and power electronics at the University of Wisconsin–Madison College of Engineering. The knowledge gained in WEMPEC-sponsored research is then transferred to the global industry sponsors' network of engineers.

Cutting-edge research is performed in advanced machines, power converters, controls and sensor technology, utility applications, and energy storage and power transfer. WEMPEC has made significant, ground-breaking advances in more than 36 notable areas since its founding in 1981.

The WEMPEC faculty has developed and continue to update a full range of semester-long courses in the fields of electrical machines, power electronics, AC drives, power systems, renewable energy, and real-time control of electromechanical systems. Most of these courses are offered for credit as recorded lectures to engineers in industry. WEMPEC counts more than 150 PhD and 400 MS degreed alumni.

### GOALS OF WEMPEC

The sponsors and the faculty directors of the program are dedicated to the development of the best possible educational, research, and service program in the area of electric machines and power electronics. Specifically the program goals include:

- Promoting a strong undergraduate elective program graduating 20–30 BS degree recipients per year.
- Sustaining strong MS and PhD programs with more than 450 on-campus students engaged in research in the fields of electric machines, power electronics, AC drives, power converter utility and renewable energy applications.
- Providing excellent instructional and research laboratory facilities.
- Developing and maintaining close and productive relationships between the program faculty and students and the sponsoring companies.

### FACULTY RESEARCH DIRECTORS

The primary faculty consist of the following professors:

- T.M. Jahns** — Director
- G. Venkataramanan** — Associate Director
- B. Sarlioglu** — Associate Director
- D.C. Ludois** — Associate Director
- E.L. Severson** — Associate Director

In addition, the following emeritus faculty assist the program in specific research and/or teaching projects as needed:

- R.H. Lasseter** — Emeritus Director
- T.A. Lipo** — Emeritus Director
- D.W. Novotny** — Emeritus Director

### RESEARCH PROGRAMS

#### Generic Research

The program faculty initiates and carries out an expanded program of graduate student research projects of a basic and widely applicable nature with the support of the program funds provided by the sponsors. Any patents resulting from sponsored generic research are assigned to the Wisconsin Alumni Research Foundation (WARF) and the sponsors' benefits are described in the second page of our Memorandum Agreement document posted on our website.

#### Focused Research Projects

Specific research projects for the benefit of a particular sponsor are handled on a grant or contract basis. WEMPEC program funds are not involved in projects of this type. Such projects are handled through the Wisconsin Power Electronics Research Center (WisPERC).

### AUGMENTED EDUCATIONAL PROGRAMS

In addition to formal classroom education, WEMPEC provides many opportunities for education and technology transfer from our cutting-edge research results.

#### Short Courses

WEMPEC faculty offer several short courses in the field of electric machines and power electronics; available to practicing

engineers through the College of Engineering's Department of Engineering Professional Development and on our website.

### Capstone Program

The Capstone Certificate is a three-course program in power electronic circuits, automatic controls, and electric drive systems that forms the core WEMPEC technologies. It also provides a stepping stone for students seeking admission into our online MS programs: Electrical Engineering (Power Engineering) or Mechanical Engineering (Controls).

### Online Graduate Engineering Degrees

WEMPEC faculty offer all the courses of interest to practicing professionals in the field of electric machines, power electronics, and controls via distance learning through the College of Engineering's Department of Engineering Professional Development. These courses enable engineers to remotely obtain MS and PhD degrees or otherwise assist in their professional development.

### Seminars

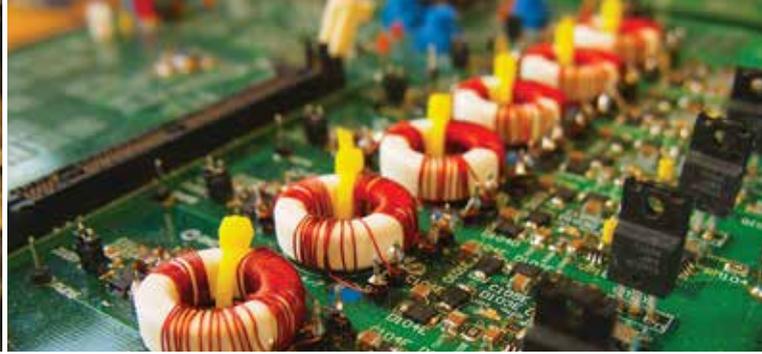
WEMPEC organizes a seminar series that features presentations by sponsor companies. These visits provide an opportunity for focused communications between sponsors and WEMPEC faculty and students. A seminar is held every Friday afternoon during the academic year. A current seminar list is included on our website.

### Internship Programs

Graduate student internships at sponsor sites that provide technology transfer opportunities are encouraged during summer and sometimes during regular semesters for interested students.

### LIAISON WITH SPONSORS

All sponsoring companies are invited to visit the campus at any time. The intent of the visit is to initiate and maintain a close working relationship between the sponsors and faculty of the program. An annual half-day technology review meeting with each sponsor on focused topics is also encouraged. These meetings are confidential and can cover any topic that the sponsor wishes to discuss—from discrete technology issues to technical road maps.



# WEMPEC

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## PROGRAM PLAN

### PROGRAM REVIEW MEETINGS

A review meeting of active sponsors, students, and faculty is held every year in Madison. The two-day meeting includes presentations from selected student projects, poster sessions of all projects, and faculty or invited presentations. Documents that summarize annual progress and cumulative results are distributed.

### INFORMATION SERVICES

**Research Reports** — Copies of research reports are made accessible on our WEMPEC website to all sponsors as soon as projects are completed. Publication through normal professional channels is, of course, anticipated.

**MS and PhD Theses** — Copies of students' MS and PhD theses are accessible on our WEMPEC website to all sponsors.

**Students** — Information on the graduate students participating in the program is provided to sponsors

### SPONSOR CONTRIBUTIONS

To provide flexibility and to better serve the diverse range of size and specialization of potential sponsors, WEMPEC operates on a unit contribution system. Each sponsor may elect to provide from one to five units of support for the program in the amount of \$17,500 per year, per unit. Sponsors electing to participate in the program do so through payment of the amount and signing the Memorandum Agreement included on our WEMPEC website. The funds contributed by the sponsors are used to provide:

- Research assistant and tuition remission support for graduate students.
- Funds for research laboratory equipment.
- Funds for administrative staff, conference attendance, publication costs, faculty visits to sponsors, and program review meetings.
- Other appropriate expenses that promote program goals.

It is the intent of the faculty research directors to communicate our plans and seek the comments of the sponsors in determining major funding policies and in establishing the direction and content of the teaching and research programs. Sponsor input to programs is obtained through informal conversations during review meetings and sponsor visits.

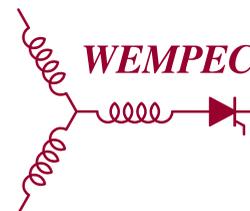
### SPONSOR BENEFITS

- Early access to results of long-term research.
- Preferred access to graduate students.
- Unique access to faculty.
- Technology transfer opportunities.
- Short-course discounts.
- License benefits for intellectual property.

### PROGRAM ADMINISTRATION

**Executive Director**  
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[WWW.WEMPEC.WISC.EDU](http://WWW.WEMPEC.WISC.EDU)

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Education

Research

Technology



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