

# The Beacon

Don't Miss The  
Annual Meeting  
on May 18!

The Monthly Publication of the Maine Section, IEEE [www.ieee.org/maine](http://www.ieee.org/maine)

May '01  
Volume 10  
Number 5

## In This Issue

Chairman's Message

New Senior Members

IEEE Continuing  
Education  
Opportunities

History and Growth of  
Section & ME EDS

Computer &  
Electron Devices  
Society Meeting  
(5/08/01)

Communications  
Society Meeting  
(5/17/01)

Annual Meeting  
(5/18/01)

Section Officers  
Election

## Chairman's Message

### The State of Your Section

by Brian Conroy, Chair

As our President and governor have recently given us the state of the union and the state of the state addresses, respectively, I thought it would be interesting to give you the "State of Your Section" report. I used the calendar year 2000 for this report.

#### Meetings

The following meetings were held within the Section during 2000:

Date	Sponsor	Topics
Feb. 15	PACE	What Every Engineer Needs to Know About Patents
April 1	CS/EDS	Introduction to Visual Basic
April 6	PES/IAS	Combined Heat and Power: Should You be Generating Your Own Electricity?
April 26	CS/EDS	A Brief History of MEMS
May 24	CS/EDS	Lithographic Challenges for the 130 nm Device Generation
June 2	Section	Annual Meeting
Oct. 2	CS/EDS	SOI Technologies: Present & Future Trends
Oct. 19	PES/IAS	Electrostatic Motors & Artificial Muscles
Dec. 7	PES/IAS	ATP Tutorial
Dec. 9	Comm.	PSO Magic of Christmas Social

#### Finances:

The year 2000 was an interesting one for Section finances. We started the year with our assets in

our own checking account and mutual fund. To comply with new financial guidelines, we liquidated our mutual fund and checking account and placed our monetary assets in an IEEE concentration banking account. Making such wholesale changes to our finances made for some interesting discussion amongst the conservative engineers on our executive committee.

We started 2000 with \$34,043.06 in total assets and ended the year with \$36,267.01. We had \$14,899.24 in expenses for the year, \$13,403.76 of which was directly related to providing programs for our members. The breakdown on program funding was as follows

Program Expense	Amount
Meetings & Social Events	\$11,197
Publication Expenses	35
Advertising - Non-IEEE	90
Professional Activities	20
Grants and Awards	75
<b>Program Expenses</b>	<b>\$13,403</b>

#### Accomplishments

Notable accomplishments in 2000 include:

- placing the entire contents of our Section Officer's Manual on the our Section web site, [www.ieee.org/maine](http://www.ieee.org/maine);
- creating a Section-with e-mail list for electronic publishing of the Beacon and timely information dissemination;
- adopting a well-thought-out student funding policy; and
- initiating a Graduates of the Last Decade (GOLD) program.

*continued on page 2*

## Chairman's Message

*continued from page 1*

### Membership

Our membership recorded slow but steady growth in 2000. We started the year with 619 members and completed the year with 655. A breakdown of our membership by grade is shown in the table below.

<i>Grade</i>	<i>Membership</i>
Life Fellows	6
Fellows	2
Life Seniors	28
Senior Members	27
Life Members	60
Members	402
PM	10
Life Associates	10
Associate Members	53
Student Members	57
<b>Total Membership</b>	<b>655</b>

### Current Events

This year, we've already had a joint PES/IAS and Project Management Institute meeting at Bath Iron Works. On May 17 we have a Communications Chapter meeting planned. We also have our annual meeting scheduled for May 18 in Orono. Please check out our web site at [www.ieee.org/maine](http://www.ieee.org/maine) for details.

If you have any suggestions on how we can improve what we do or how we can better serve you, please let me know. After all, the State of the Section depends on how well we serve our members.

## New Senior Members

The following Section members are newly elected Senior Members:

*Claude P. Brancart*  
*Robert A. Surette*

**Congratulations!**

## Continuing Education Opportunities

*Editor's note: The following announcements are educational opportunities that IEEE has arranged for its members through partnerships with several engineering schools around the country.*

### IEEE JOINS WITH UNIVERSITIES ON DISTANCE LEARNING

The IEEE has partnered with select universities to provide IEEE members with discounts on Web-based courses. Members who enroll can receive discounts of up to 10 percent off tuition. Members may earn graduate certificates and advanced degrees entirely on-line in telecommunications, project management or computer science. University partners participating in this expanding program include New Jersey Institute of Technology, U.S. Open University, Stevens Institute of Technology, Pace University and National Technological University. For the full list of courses, or to learn more about the advanced degrees and professional development certificate programs available through the IEEE, go to:

<http://www.ieee.org/eab/PDI/wbc/>.

### UNIVERSITY OF WASHINGTON JOINS IEEE PDI

The IEEE is pleased to announce a new educational partnership with the University of Washington (UW), USA. The UW has been ranked in the top ten in many technical departments including Computer Science and Engineering and overall has been ranked as one of the top 50 universities in the United States. Through this agreement, IEEE members will receive a 10% discount on selected courses offered by UW's Education at a Distance for Growth and Excellence (EDGE) and Educational Outreach (UWEO) programs.

This partnership is designed to provide maximum flexibility for IEEE members. UW courses can be taken individually or as part of a degree program, for college credit or on a non-credit basis, in the classroom at UW or through distance learning, through the web or by CD ROM or video. EDGE programs are instructor-led distance learning experiences with scheduled dates and times and a fixed group start. UWEO are all distance learning classes delivered asynchronously and online that may be taken at the individual's convenience.

Selected classes range from engineering courses to business management, from programming certificates to coursework about web essentials. At present there are 6 masters degrees as well as 13 certificate programs offered, with more being added each semester.

To view the full IEEE selected course catalog and further information about these UW programs, go to, [www.ieee.org/eab/PDI/uw/index.htm](http://www.ieee.org/eab/PDI/uw/index.htm). Registration for these courses must be through the IEEE PDI website, to receive your membership discount. For further information contact Alan Trembly, Manager, Technical & Electronic Product Development, at [a.trembly@ieee.org](mailto:a.trembly@ieee.org) or +1 732 562 5488.

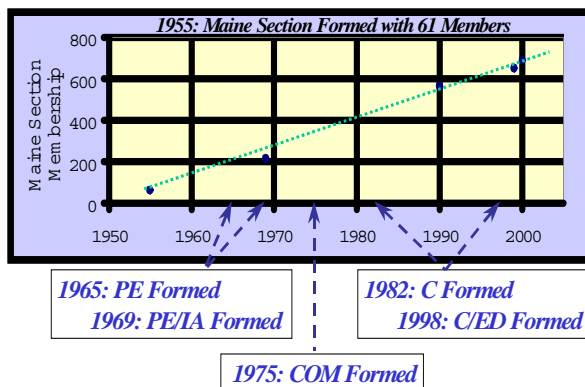
# History and Growth of the Maine Section and the Maine EDS

by Dave Potts, Section Vice-Chair & Past CS/EDS Chair

As last year's Chair of the Computer and Electron Devices Chapter, I represented the Maine C/ED Chapter at the EDS Regions 1-7 & 9<sup>1</sup> Chapters Meeting, held December 10, 2000 in San Francisco. The Maine Chapter was one of five chapters invited to make a presentation on our activities and best practices. The other chapters presenting were the Yugoslavia ED/SSC Chapter (2000 EDS Chapter of the Year), the Toronto CAS/ED/CPMT/LEO Chapter and 2 student chapters (the San Diego Section ED/LEO Student Branch Chapter at the University of California, San Diego and the Mexico Section ED CINVESTAV-IPN Student Branch Chapter). In the introduction to my presentation, I provided some background on the history and growth of the Maine Section and the EDS Chapter. I thought it would make a nice supplement to Brian Conroy's Chairman's Column this month to include some of this information here.

## History and Growth of the Maine Section

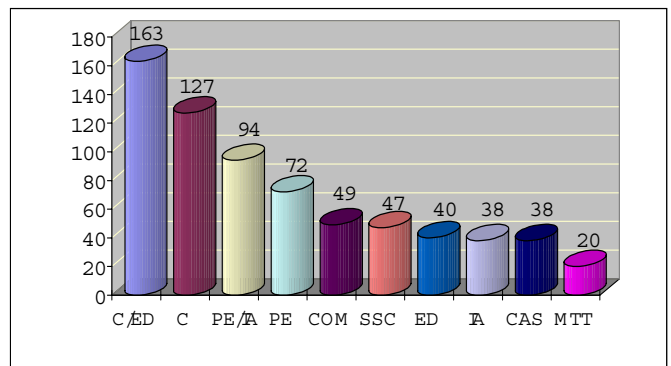
In 1954, Maine was organized as a subsection of the Lynn, Massachusetts Section of the American Institute of Electrical Engineers (AIEE)<sup>2</sup>. The Maine Subsection petitioned the AIEE for full Section status in 1955 and, on June 30, 1955, the Maine Section of the AIEE was formed with a 61 members. Most membership figures over the years have been lost, but what few data points remain suggest a remarkably consistent net growth rate of about 15 members/year:



## Societies Represented in Maine

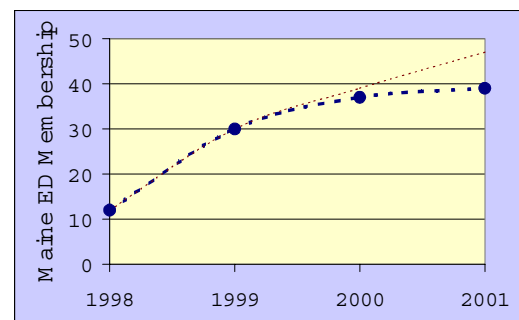
The Maine Section currently has 3 active chapters. The Power Engineering (PE) Chapter was formed in 1965, becoming a joint PE/IA (Industrial Applications) Chapter in 1969. The Communications (COM) Chapter was formed in

1975. The Computer (C) Chapter was formed in 1982, becoming a joint C/ED (Electron Devices) Chapter in 1998. As of October 2000, the Maine Section membership database included 163 C/ED members (123 C-only, 36 ED-only and 4 C/ED), 94 PE/IA members (56 PE-only, 22 IA-only and 16 PE/IA) and 49 COM members:



## Growth of EDS in Maine

There has been significant growth in EDS membership in Maine over the past few years. When the joint Maine C/ED Chapter was founded in 1998, there were 12 EDS members in Maine. By early 1999, EDS membership had grown 150% with the addition of 18 new members. We have accrued an additional 9 new members per year since then, but these gains have been offset by attrition and net EDS membership level seems to be leveling off at around 40.



More information on the history and operations of the Maine Section is available in the online Officer's Manual found on the Section web site at [www.ieee.org/maine](http://www.ieee.org/maine).

<sup>1</sup> Regions 1-7 & 9 encompass all of North and South America.

<sup>2</sup> The AIEE was formed in 1884 with an initial slate of officers that included Norvin Green, president of Western Union Telegraph Company, as the president and Alexander Graham Bell and Thomas A. Edison as 2 of the 6 Vice-Presidents. However, the AIEE tended to be oriented more towards power engineering and with the advent of radio, several new organizations evolved in the early 1900's. Two of these, the Society of Wireless Telegraph Engineers and The Wireless Institute merged in 1912 to form the Institute of Radio Engineers (IRE). The IRE membership, which had remained fairly small throughout its early history, experienced dramatic growth in the post-WWII era, exceeding the size of the AIEE by the 1950's. Individually, neither the IRE nor the AIEE encompassed the complete spectrum of electrical engineering, and there were overlaps in coverage of some areas. The late 1950's and early 1960's witnessed increased discussions of merging, culminating in the formation of the IEEE on January 1, 1963. For more information, see "The Origins of the IEEE" (from which I gleaned all this), available at [www.ieee.org/organizations/history\\_center/historical\\_articles/history\\_of\\_ieee.html](http://www.ieee.org/organizations/history_center/historical_articles/history_of_ieee.html).

# Electron Devices and Computer Societies Chapter Meeting

## *Optical and Electronic Characteristics of Doped GaN and AlGaIn/GaN Superlattice Structures*

Dr. Ian D. Goepfert, Fairchild Semiconductor Corporation

Tuesday, May 8, 2001

**Abstract:** In the last decade, research and development efforts on the direct bandgap semiconductor compound gallium nitride (GaN) and its related ternary alloys indium gallium nitride (InGaIn) and aluminum gallium nitride (AlGaIn) have increased substantially. The primary interest in GaN based devices is the ability to vary the bandgap of the alloy between 1.8 and 6.2 eV (700 to 200 nm) by incorporating either Al or In, respectively. In particular, the ability to produce blue light emitting diodes (LEDs) and laser diodes (LDs) is of substantial importance in producing, for example, full color displays, high density optical storage technologies, and medical applications. Transistors based on GaN technology will also become important for high power, high temperature and radiation intensive applications.

In this presentation, investigations into the optical and electronic characteristics of doped GaN and AlGaIn/GaN will be presented. A model will be developed that accounts for the dominant optical transitions in doped GaN. The model will explain the compensating nature of the defect that causes a broad, yellow optical transition in silicon doped GaN. An intuitive model based on classical electrostatics explains the spectral broadening of GaN as the silicon concentration is increased over two orders of magnitude. Implications for optoelectronic and electronic devices will be discussed.

Essential to the successful commercialization of GaN based devices is the efficient activation of the *p*-type dopant magnesium (Mg). The Mg acceptor has an activation energy of 200 meV, which allows for only a few percent of acceptors to be ionized at room temperature. This leads to substantial series resistance in the *p*-layers of devices. It will be shown that AlGaIn/GaN superlattice structures uniformly doped with Mg have almost an order of magnitude increase in free carriers compared with *p*-type bulk GaN. It is shown that the enhanced activation of acceptors leads to a one order of magnitude increase in conductivity of the superlattice structures when compared with *p*-type bulk GaN.

Design issues concerning the incorporation of doped superlattice structures into the geometry of optoelectronic and electronic devices will be discussed.

**About the Speaker:** Ian D. Goepfert received his B.B.A. with majors in Finance, Economics, and Accounting in 1986 from Texas Tech University. Upon graduation, he worked in commercial banking and commercial real estate development for four years in the Boston area. In 1990, he enrolled in the M.S. in Aerospace Engineering program at Boston University. His research interests focused on computational fluid dynamics. Upon completion of his M.S.A.E. in 1992,

he enrolled in the M.S. in Electrical Engineering program at Boston University. His research interests included electro-dynamics, nonlinear optics, optoelectronics, and laser gyroscopes. His master's thesis focused on a theoretical analysis of electrodynamics in non-inertial frames of reference, i.e., the physical mechanisms underlying optically based inertial guidance systems. In 1994, he enrolled in the Ph.D. program in Electrical Engineering at Boston University. His research interests focused on the III-V compound semiconductor gallium nitride (GaN) and its ternary alloys indium gallium nitride (InGaIn) and aluminum gallium nitride (AlGaIn). His research included studies of the optical and electronic characteristics of bulk GaN material and GaN based light emitting diodes and laser diode structures. The focus of his dissertation was the demonstration of a one order of magnitude increase in the conductivity of uniformly *p*-doped AlGaIn/GaN superlattice structures as compared to *p*-type bulk GaN. In 2001, he joined Fairchild Semiconductor Corporation where his primary responsibilities include developing device and process simulation models for bipolar junction and field effect transistor technologies.

**Schedule:** 5:30 PM Social

6:00 PM Dinner

7:00 PM Presentation

**Cost:** The cost for the dinner is \$15 for IEEE Members and \$20 for guests/non-members (\$5 for full-time college students) No cost for talk only, but you must still register to ensure a chair is available for you.

**Location:** Embassy Suites, Portland, ME

**Reservations:** We encourage you to use the online registration form found in the listing for this event on the Maine IEEE Web ([www.ieee.org/maine/](http://www.ieee.org/maine/)) or you may contact Jason Woloszyn@ (207) 775-8475 or e-mail at woloszyn@ieee.org to reserve your slot. If you have a special dietary need, be sure to tell Jason. Please make your reservation by noon on Friday, May 4, 2001. Note that dinner reservations canceled after this time will still be charged unless you are able to fill your vacated slot. As always, you are welcome to attend the talk without any cost, but please let us now you are coming so that we may ensure that there are enough chairs. For information about this talk or the Maine IEEE Electron Devices and Computer Society, contact Prof. Mustafa G. Guvench at (207) 780-5581 or guvench@usm.maine.edu.

**Directions:** Embassy Suites is located within the Portland Jetport complex, just off Maine Turnpike Exit 7A.

**Joint IEEE Communications Society and Maine Association of Engineers Meeting  
Tours of Hermon High School Technology Center  
and  
Maine Independence Station**

*Meeting Host: Andrew Perkins, Perkins Engineering, Inc.*

**Thursday, May 17, 2001**

**GENERAL**

Make your reservations early for what promises to be an exciting and interesting meeting. This is the kick off meeting for a more active Maine Section of IEEE Communications Society and The Annual Meeting for the Maine Association of Engineers.

Maine Independent Station is the latest State-of-the-art technology Electrical Power Generating Facility in Maine. The plant is powered by natural gas from the new Maritimes & Northeast pipeline. MIS produces 520 megawatts of power. Mr. Tom Broad, Plant Manager for Maine Independent Station, a DUKE FLUOR DANIEL Company, will present us with a comprehensive tour of the facility.

Hermon High School Technology Center is also a State-of-the-art facility. The technology center has been growing under the direction of Jeff Wheeler, Director of Technology for Hermon School Department. The facility has developed into a comprehensive school, community, and regional facility providing services to Hermon Schools, Residences, Businesses, Community and regional needs. The facility is dynamic in it's continued growth of functionality and services. You can check out the technology center by going on-line at [WWW.HERMON.NET](http://WWW.HERMON.NET). Jeff will provide us with an informative discussion and tour of his impressive facility.

**MEETING AGENDA**

- 1:45 PM Meet at MIS
- 2:00 PM 1<sup>st</sup> group (20 to 25); Orientation, safety equipment and video.
- 2:20 PM 1<sup>st</sup> group start tour.  
2<sup>nd</sup> group (20 to 25); Orientation, safety equipment and video.
- 2:40 PM 2<sup>nd</sup> group start tour.
- 3:40 PM End of MIS tour  
Depart MIS
- 4:30 PM Arrive at Hermon High School  
BOD Meeting of MAE. Separate room
- 5:00 PM Welcome Remarks: Andy Perkins
- 5:05 PM Buffet Dinner by Hermon High School, Food Services.
- 6:30 PM Introduction of Jeff Wheeler and short talk on Technology Center
- 7:00 PM Separate into groups of +/- 20 for Tour of Technology Center
- 8:30 PM Meetings end

**DIRECTIONS to MIS**

From I-95 traveling northbound, take exit 49, turn right onto Hogan Road travel +/- 1 mile, turn left onto Mount Hope Ave. travel +/- 2 miles turn left onto State St. (Rt. 2), proceed 1-1 ½ miles, turn right onto School St. follow signs to MIS.

From I-95 traveling southbound, take exit 49, turn left onto Hogan Road travel +/- 1 mile, turn left onto Mount Hope Ave. travel +/- 2 miles turn left onto State St. (Rt. 2), proceed 1-1 ½ miles, turn right onto School St. follow signs to MIS.

**Directions to Hermon High School**

From I-95 traveling northbound, take 45 West, I-395, Rt. 2 & Hammond St. to Hermon. Follow Rt. 2 approximately 5 miles. Turn right approximately ¼ mile past Central Maine Harley Davidson on your right. Watch for sign "HERMON HIGH SCHOOL".

From I-95 traveling southbound take 45 West, Rt. 2 & Hammond St. to Hermon. Follow Rt. 2 approximately 5 miles. Turn right approximately ¼ mile past Central Maine Harley Davidson on your right. Watch for sign "HERMON HIGH SCHOOL".

**Meeting cost:** \$14.00 per person for a buffet style, dinner turkey breast dinner with all the trimmings

**Reservations:** Make reservations with Andy Perkins

e-mail: [aperkins@mint.net](mailto:aperkins@mint.net)  
Phone: (207) 866-3271  
USPS: Andrew Perkins  
Perkins Engineering, Inc.  
167 Kelley Road  
Orono, ME 04473

**Please make your reservations early (no later than May 3, 2001) in order to insure available space on the MIS Tour.** The maximum number of individuals for MIS will be approximately 50. The cutoff will be on a first come first serve basis. No shows will be invoiced if cancellations are not made by May 14<sup>th</sup>.

All individuals should make checks payable as follows:

Members MAE: Maine Association of Engineers

Members IEEE: Maine Section IEEE

All prepayments would be appreciated. As always feel free to invite spouses and fellow engineers

IEEE Maine Section  
**Annual Meeting, 2001**  
*Black Bear Inn*  
*Orono, Maine*  
**Friday, May 18, 2001**

**The program**

Come and join us at the 2001 IEEE Maine Section annual meeting. This year we are visiting the University of Maine at Orono. We'll tour one of the University's newer research facilities and enjoy a planetarium show at the Jordan Planetarium.

Our speakers include University of Maine Professor George Markowsky, president of Trefoil, Incorporated, and cofounder of the Maine Software Developers Association. Professor Markowsky is in a unique position to offer us a glimpse at the process of creating a high-technology software company in Maine.

We'll also hear from Steven R. Walk of the Maine Maritime Academy's Center for Technology Forecasting. We'll find out how human behavior and technology change relate to one another, and how technology forecasting helps state agencies, institutions and companies like Central Maine Power.

Our banquet speaker is Professor Gill Pratt, director of the MIT Leg Laboratory. Part of the MIT Artificial Intelligence Laboratory, the Leg Lab is dedicated to studying legged locomotion and building dynamic legged robots. Over the years, the lab has deepened our understanding of biological locomotion and in the process has produced fascinating walking and hopping machines and surprisingly realistic computer animations of human and animal locomotion.

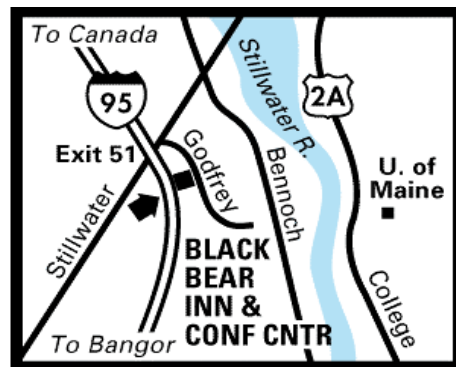
After registration at the Black Bear Inn, we'll tour the Advanced Engineered Wood Composites Center. Combining state of the art materials science with one of Maine's traditional natural resources, the AEWCC center conducts research leading to the commercial development of cost-effective, high-performance, wood-nonwood composite construction materials. The scope of this laboratory ranges from polymer science to finite element analysis on supercomputers to structural testing of full-scale bridge beams. It's a remarkable tour that you won't want to miss.

We've also reserved a group showing of *Our Place in Space* at the University's Jordan Planetarium and Observatory. Suitable for children and adults, the show provides a cosmic perspective of our status as inhabitants of the solar system. Don't miss this chance to visit Maine's first planetarium.

**Agenda:**

1:00 PM, May 18	Meet at the Black Bear Inn
1:30 - 2:30	Tour of Advanced Engineered Wood Composites Center
3:00 - 4:00	Jordan Planetarium show, <i>Our Place in Space</i>
4:15 - 5:00	Reassemble at the Black Bear Inn
5:00 - 5:30	George Markowsky, Trefoil, Inc. <i>Developing a Software Business in Maine</i>
5:30 - 6:00	Seven Walk, MMA, <i>Technology Forecasting, Understanding Human Behavior and Technology Change</i>
6:00 - 7:30	Dinner
7:30 - 8:00	Gill Pratt, <i>MIT Legged Locomotion Laboratory</i>
8:00 PM	Adjourn

**Directions to the Black Bear Inn**



From I-95, take Stillwater Old Town Exit (Exit 51), travel toward Orono. The first road on right is Godfrey. The Best Western Black Bear Inn & Conference Center is 300 yards past the gas station.

*Please Note*

**Registration information at bottom of next page !**

**Institute of Electrical and Electronics Engineers**  
**Maine Section**  
*Notice of Intent to Elect Officers*

In accordance with Article VI, Section D of the IEEE Maine Section Bylaws, notice is hereby given that an election of officers for the 2002 Section year will be held at the Annual Meeting in Orono, Maine on Friday May 18, 2001 unless petitions are received as outlined below.

The slate of officers recommended by the Nominating Committee for the 2002 Section year is as follows:

Chairman	<b>David Potts</b>	Fairchild Semiconductor
Vice Chair	<b>Daniel Martin</b>	Integrity Systems, Inc.
Secretary	<b>Tom Carbone</b>	Fairchild Semiconductor
Treasurer	<b>Merlin Smith</b>	IBM (retired)
Junior Member - at - Large*	<b>David Kotecki</b>	University of Maine

\*Two-year term as Member-at-Large

**Previously Elected**

Senior Member - at - Large	<b>Valeria Bernier J</b>	LANCO Assembly Systems
Junior Past Chairman	<b>Brian Conroy</b>	Central Maine Power

**From the Maine Section Bylaws:**

**Article VI**

**Section E** Nominations for any or all offices may be made by petition under the following provisions:

1. Such petition or petitions shall bear the personal signature of a least 10 voting members of the Maine Section.
2. Such petition or petitions must be delivered to the Secretary not later than April 1.
3. The nominee or nominees covered by such petition or petitions shall be included in the regular ballot and designated as such.

**Article VII**

**Section A** If no nominations by petition are received by the Secretary as outlined under Article VI, Section E of these Bylaws, then no further announcement to the Section membership is necessary and the election, by voice vote, shall be held at the Annual meeting

**Section B** If there develops a contest for any elective office as provided for under Article VI, Section E of these Bylaws, then an election by written ballot shall be held.

**Annual Meeting Registration:**

Please return the coupon below **by May 11** to the following address:

Valeria Bernier  
 18 Park Way  
 Bowdoin, ME 04287

The price is \$30 per person, and should be paid the day of the event. The planetarium show is an additional \$4 per adult, or \$3 for students or those under age 18. If you would like to make hotel reservations, please call the Black Bear Inn directly at 207-866-7120. For more information, check the Maine Section IEEE calendar at <http://www.ewh.ieee.org/r1/maine/>.

Name: \_\_\_\_\_

Number of Banquet tickets: \_\_\_\_\_ adults \_\_\_\_\_ students/under 12

Number of planetarium show tickets: \_\_\_\_\_ adults \_\_\_\_\_ students/under 18

Phone Number: \_\_\_\_\_ E-mail: \_\_\_\_\_

# Beacon Publishing

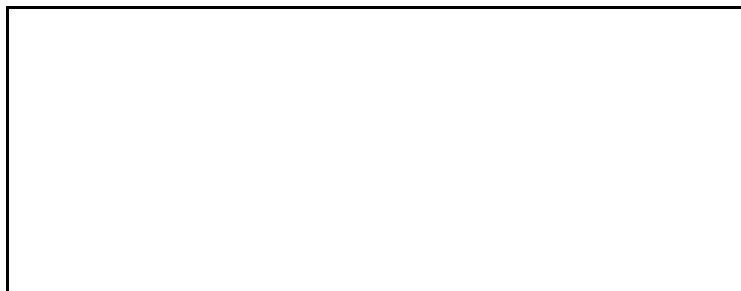
The Beacon is published on a monthly schedule based upon the need to advertise upcoming meetings. All material submitted for the Beacon must be received by the editor no later than the 15th of the month preceding the issue in which it should be included. Sorry, NO EXCEPTIONS!!

**Send articles to:**

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