Final Report

Grant: DE-SC0004873

Date: March 10, 2011

Title: Student Support for EIPBN 2010 Conference

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I. Introduction

The 54th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN), 2010, was held at the Egan Convention Center and Hilton in Anchorage, Alaska, June 1 to 4, 2010. The EIPBN Conference is recognized as the foremost international meeting dedicated to lithographic science and technology and its application to micro and nanofabrication techniques. The conference brought together 444 engineers and scientists from industries and universities from all over the world to discuss recent progress and future trends. Among the emerging technologies that are within the scope of EIPBN is Nanofabrication for Energy Sources along with nanofabrication for the realization of low power integrated circuits. Every year, EIPBN provides financial support for students to attend the conference. The 2010 Conference Chairman is Dr. Franklin Schellenberg a consultant and the Program Chairman is Prof. Martin Feldman of Louisiana State University. The Conference is organized and managed by a Steering Committee, which is incorporated in the state of New Jersey, and fully protected by liability insurance. In addition to the Conference Chair and Program Chair the members of the Steering Committee at the time of the conference were:

Richard Blaikie, University of Canterbury, Christchurch, New Zealand
Alan Brodie, KLA-Tencor
Steve Brueck, University of New Mexico
Stephen Chou, Princeton Univ.
Elizabeth Dobisz, Hitachi, GST
Reginald C. Farrow, New Jersey Institute of Technology
Michael Fritze, DARPA
Cynthia Hanson, SPAWAR Systems Center, San Diego

The steering committee and attendees view students as the lifeblood of the conference, in that they both provide a fresh and exciting perspective, and also become the future scientists attending the conference in the future on a regular basis. Financial support provided for their travel to the conference came from a mixture of government agencies and private donors. The Department of Energy Office of Basic Energy Sciences provided $15,000 to support 20 students from US universities to participate at EIPBN 2010 through grant DE-SC0004873.

II. EIPBN 2010 Student Participation

Student presentations are a vital part of the EIPBN Conference. They contain new, innovative approaches to the topics of the conference that are of great interest to the technical community at large. Furthermore, once the students graduate and launch their careers in the field, they become the regular attendees of the conference for years to come. If they become professors, they advise students in turn on projects that address future problems in the field of the conference, and the cycle continues. In this regard, maintaining strong student participation is a requirement for the long-term viability of the conference. Although the location for EIPBN 2010 had great financial advantages for the regular business of the conference, from a student's point of view, it was problematic. Unlike locations in the lower 48 states, students cannot all simply pile into a van and share the drive to the conference city, or share a less expensive room near the conference venue once they arrive. Air travel is the only practical way to come to Alaska, with

air tickets running at least $500, and in June, even the cheapest hotels in Anchorage are almost as expensive as the conference rate ($189) at the Hilton. Yet, in spite of these obstacles, the student population of EIPBN 2010, at 126 students, was on par with previous years, as shown in Table I:

Registered Attendees	2008 Portland, OR		2009 Marco Island, FL		2010 Anchorage, AK	
Students	92	22.3%	136	31.4%	126	28.4%
University	190	46.0%	267	61.7%	259	58.3%
Total	413	100%	433	100%	444	100%

Table I: Comparison of total registrants with university affiliated technical registrants and student registrants for the past 3 years of EIPBN. Totals from 2010 include non-paying plenary and invited speakers, while 2008 and 2009 counts are from NetEvents registrant lists, and may include only paid registrants.

In fact, there were 37% more students at EIPBN 2010 than at the far more accessible Portland conference. This may simply reflect the general increase in the university population of the conference overall, which increased by 36% over the same interval. Several things were done at EIPBN 2010 to encourage student participation. In particular, EIPBN Conference management provided:

- Inexpensive student registration rates
- Inexpensive housing at the University of Alaska – Anchorage
- Financial support for 66 students

Inexpensive Student Registration Rates

This year, as in previous years, the advance student registration rate was set to $200, with the on-site student registration set to $250. Most students (99, or 80% of student attendees) were 1st authors on either an oral or poster presentation. This is not surprising, since the time and expense for a student to attend the conference is usually justified only if a paper is to be presented. An additional 18 students were present as co-authors on a paper or poster. Some of these may have actually been presenters, as there was no formal comparison of the program and actual speaker / poster presenter. A breakdown of student registrations by primary conference role is shown in Table II.

Student Roles in EIPBN 2010	USA	Canada	Europe	Asia/ Pacific	Total
1st Author Oral	36	3	5	2	46
1st Author Poster	34	0	10	9	53
Co-author Oral	5	0	2	0	7
Co-author Poster	9	0	0	2	11
Non-author	6	0	1	2	9
Total	90	3	18	15	126

Table II: Roles of students at EIPBN 2010, correlated with the final Table of Contents in the EIPBN 2010 Program of Abstracts, as distributed by Memory stick at conference registration.

Inexpensive housing at the University of Alaska – Anchorage

EIPBN negotiated an arrangement with Conference Services at the University of Alaska – Anchorage (UAA) for use of a student dormitory to provide student housing during EIPBN 2010. The UAA Conference Services group regularly rents out dorm space to facilitate conferences held on campus, so they have management in place for room reservations and housekeeping. The campus was about a 5-mile drive from the downtown conference center, and in typical traffic, it takes about 15 minutes to get from the campus to the downtown convention center. There is a direct bus line that runs very close to the building, but the bus run can take considerably longer. For students renting cars in Anchorage, UAA has ample free parking available near the dormitory. Since the city bus service from campus to downtown can be somewhat time consuming, EIPBN 2010 also paid for a UAA Shuttle bus driver to take students from the student housing to the Egan Convention Center each morning of the conference. The shuttle departed on a schedule to allow it to arrive ½ hour before the first conference session of the day. Sign-up sheets for the shuttle bus were posted at the UAA dorm registration desk. Since it was impossible to anticipate when students would want to leave downtown, however, no return shuttle was provided.

The UAA dorm rooms proved to be extremely popular. Over 70 students reserved rooms at the EIPBN block, many staying over the weekend as well to do sightseeing in Alaska. Feedback from students was extremely positive. Many were extremely grateful to have this inexpensive lodging option, and without it, many would not have come to Alaska for EIPBN 2010. This appears to have been a significant contributor to achieving the goal of maintaining student participation in EIPBN 2010.

Student Financial Support

As in years past, financial support for student travel was provided. Some of these funds were provided by a private company, other support came from government grants from either the National Science Foundation (NSF) or the Department of Energy Office of Basic Energy Sciences (DoE). The amount funded was chosen to correspond on average to the cost of an air ticket to Anchorage to attend the conference. Many typical conference itineraries were entered into travel websites Expedia.com and Orbitz.com to make this estimate. For students from the US / Canada, this amount was estimated to be $750. For students from Europe and Asia, this amount was estimated to be $1250. As part of the conditions for receiving funds, students were:

1) Required to register for the conference, and
2) Asked to volunteer for various tasks that may be available for students.

The tasks we usually ask students to perform at the conference are assisting the session chairs in managing their room, usually helping questioners be heard by running microphones to them. This year, we also used student support at the panel discussion, providing roving microphones to allow questions from the audience to be heard. Students are also asked to help at the set up time the physical posters, putting banners on the poster boards to identify the locations where individual posters are to be placed.

III. Awarding Student Funds

A detailed process was used to decide which student should receive financial support. These steps were listed in detail on the conference website.

Acceptance of Abstract: First, it was required that students have their name on an *accepted abstract* to be considered for travel reimbursement. The decisions about student support were therefore made after the Program Chair had prepared the initial Program.

Request by Professor: Second, the student's *Professor* needed to send a request for financial support to either the Conference Chair or the Program Chair. Requests from students themselves were returned and the students asked to have their professor provide a request. All requests were forwarded to the Program Chair for final disposition.

Sorting: At a predetermined cutoff date, the list of requests received up until that date were sorted using the average reviewer's scores for the abstracts. Abstracts receiving higher scores were ranked higher than those receiving lower scores. If there was a tie for a position in the ranking, the date of the Professor's request was also considered, with earlier requests given precedence over later requests.

Granting: The final cutoff was determined by the budget set for student support by the Conference Chair. For EIPBN 2010, the limit was set at 66 students, corresponding to the number of volunteer jobs available: 2 students for each of the 30 oral sessions, 4 for the Poster session, and 2 for general assistance. A listing of the roles receiving student support is shown in Table III below.

Student Support at EIPBN 2010	USA	Canada	Europe	Asia/ Pacific	Total
1st Author Oral	27	2	0	0	29
1st Author Poster	18	0	7	2	27
Co-author Oral	2	0	1	0	3
Co-author Poster	5	0	0	1	6
Non-author	1	0	0	0	1
Total	53	2	8	3	66

Table III: Distribution of Student Financial Support, compared to student roles determined from final Table of Contents in the EIPBN 2010 Program of Abstracts.

Although this process was rigorous, it also required some flexibility. Some students withdrew from participation in the conference, designating an alternate co-author for the paper to present in their place. The alternate then received the student support (since the paper would clearly have the same ranking). In other cases, a paper was entirely withdrawn. In that case, the next student on the list, just below the cutoff, was invited to receive financial support.

A variety of universities, countries, and topics were represented among the students receiving support. Students from 9 countries (including the US) and 30 universities were among the recipients of student travel financial support. We expect the dominance of US recipients reflects not the quality of abstracts, but the general lack of awareness of the program of financial support among overseas (and at some US) institutions. Some counts showing this distribution are shown below in Table IV.

Number of Students	Country	Number of students	Institution
2	Canada		
		1	University of British Columbia, BC
		1	University of Waterloo, ON
3	Germany		
		2	University of Tübingen
		1	University of Wuppertal
1	Japan	1	Tokyo University of Science
1	Netherlands	1	Delft University of Technology
2	Scotland, UK	2	University of Edinburgh
1	Singapore	1	National University of Singapore
2	Switzerland	2	École Polytechnique Fédérale de Lausanne
1	Taiwan	1	National Cheng Kung University
53	USA		
		1	California Institute of Technology
		4	Columbia University
		2	Georgia Institute of Technology
		2	Illinois Institute of Technology
		3	Louisiana State University
		10	Massachusetts Institute of Technology
		3	Princeton University
		1	Purdue University
		1	Rice University
		4	Stanford University
		1	State University of New York - University at Albany
		3	Texas A & M University
		3	University of California at Berkeley
		3	University of Houston
		1	University of Illinois at Champagne Urbana
		1	University of Kentucky
		2	University of Michigan
		2	University of New Mexico
		5	University of Texas at Dallas
		1	University of Utah

Table IV: Distribution of Countries and Institutions receiving EIPBN 2010 Student support.

The list of students receiving EIPBN 2010 financial support are listed in Table V.

Student Name	Abstract Score	Requesting Professor	University	Session / Topic
Naga Korivi	Invited	Pratul Ajmera	Louisiana State Univ.	P10 Nanobiology
Heon Joon Choi	Invited	Timothy Groves	SUNY Albany	4A Electron Beams II
Mingyuan Huang	Invited	Julia Greer	Cal Tech	1B Nanostructures I
Kosar Baghbanu Parizi	Invited	Yoshio Nishi	Stanford University	P10 Nanobiology
Ronny Löffler	Invited	Dieter Kern	University of Tübingen Germany	P3 Emerging Technology P15 Nanostructures
Saskia Möllenbeck	Invited	Hella-Christin Scheer	University of Wuppertal Germany	P12 Nanoimprint 3A Nanoimprint I
Chao Wang	17.00	Steve Chou	Princeton University	1B Nanostructures I
Rajakumar Manthena	16.12	Rajesh Menon	University of Utah	P16 Novel Imaging
Alexander Kaplan	16.11	L. Jay Guo	University of Michigan	2B Nanostructures II 9C Nanophotonics III
Yi-Kuei Wu	16.00	L. Jay Guo	University of Michigan	P14 Nanophotonics 9C Nanophotonics III
David Jun	15.86	Pieter Kruit	Delft Univ. of Technology Netherlands	P5 Focused Ion Beams
Jae-Byum Chang	15.71	Karl Berggren	MIT	4C Directed Assembly I
Anil Kumar	15.71	Nicholas Fang	University of Illinois at Urbana-Champaign	1A Electron Beams I
Erika Penzo	15.71	Shalom Wind	Columbia University	2B Nanostructures II 6C Directed Assembly II
Ginusha Perera	15.71	Gila Stein	University of Houston	8A Metrology
Kyung-Hak Choi	15.62	Jeong-Bong Lee	Univ. of Texas at Dallas	3A Nanoimprint I
Filip Crnogorac	15.57	Fabian Pease	Stanford University	5B Emerging Technology II
Nicole Devlin	15.57	Devin Brown	Georgia Tech	P15 Nanostructures
Leili Baghaei-Rad	15.43	Fabian Pease	Stanford University	P7 Metrology 8A Metrology
Katherine Harry	15.43	Karl Berggren	MIT	P15 Nanostructures
Jie Sun	15.43	Hank Smith	MIT	9C Nanophotonics III
Mukti Aryal	15.38	Walter Hu	Univ. of Texas at Dallas	7A Nanoimprint III 9A Nanoimprint IV
Saba Ghassemi	15.29	Shalom Wind	Columbia University	2B Nanostructures II 4B Nanobiology
Mona Klein	15.14	Veronica Savu	EPFL Lausanne Switzerland	10B Nanostructures IV
Edgar Palacios	15.00	Leonidas Ocola	Illinois Inst. of Technology	9B Microfluidics
Donald Winston	15.00	Karl Berggren	MIT	P2 Electron Beams P5 Focused Ion Beams P7 Metrology
Michael Wojcik	15.00	Derrick Mancini	Illinois Inst. of Technology	P15 Nanostructures
Alex Bruccoleri	14.86	Pran Mukherjee	MIT	2B Nanostructures II
Huifeng Li	14.71	Xing Cheng	Texas A&M University	P1 Directed Assembly
Bing Dai	14.71	Fabian Pease	Stanford University	P7 Metrology 8A Metrology 8C Novel Imaging 10B Nanostructures 4 Chair
Svyatoslav Smolev	14.71	Steven Brueck	Univ. of New Mexico	3C Nanophotonics I
Hsin-Yu Tsai	14.71	Hank Smith	MIT	10B Nanostructures IV
Ying Hu	14.62	Hyuck Choo	Rice University	2A Modeling
Suresh Regonda	14.57	Walter Hu	Univ. of Texas at Dallas	4B Nanobiology
Chris Clifford	14.57	Andy Neureuther	UC Berkeley	2A Modeling
Wendi Li	14.57	Steve Chou	Princeton University	3A Nanoimprint I 9A Nanoimprint IV
Yi Yang	14.57	Walter Hu	Univ. of Texas at Dallas	9A Nanoimprint IV

Table V: Students receiving EIPBN 2010 Student Financial Support. Session numbers beginning with "P" are poster sessions, sessions beginning with numbers represent oral sessions.

Table V Continued…

Rhonira Latif,	14.57	Rebecca Cheung	University of Edinburgh Scotland, UK	P13 Nanomechanics
Enrico Mastropaolo	14.56	Rebecca Cheung	University of Edinburgh Scotland, UK	P13 Nanomechanics
Tao-Hua Lee	14.33	Xing Cheng	Texas A&M University	8B Nanostructures III
Fei Ding	14.14	Steve Chou	Princeton University	P15 Nanostructures
Mina Fouad	13.88	Bo Cui	Univ. of Waterloo Canada	9B Microfluidics
Hyungryul Choi	13.86	Chih-hao Chang	MIT	P15 Nanostructures
Kawsar Alam	13.86	Alireza Nojeh	Univ. British Columbia Canada	2A Modeling
Katrin Sidler	13.86	Jürgen Brugger	EPFL Lausanne Switzerland	P6 Masks & Maskless P15 Nanostructures
Zhen Zheng	13.78	Dmitri Litvinov	Univ. of Houston	P17 Patterned Media
Roger Piqueras Jover	13.62	Shalom Wind	Columbia University	P10 Nanobiology 2B Nanostructures II
Kevin Brenner	13.50	Raghunath Murali	Georgia Tech	3B Emerging Technology I
Bastian Zeeb	13.50	Dieter Kern	University of Tübingen Germany	P14 Nanophotonics
Teresa Fazio	13.29	Shalom Wind	Columbia University	P10 Nanobiology 2B Nanostructures
Precious Cantu	13.14	Martin Feldman	Louisiana State Univ.	P3 Emerging Technology
Vitor Manfrinato	13.14	Karl Berggren	MIT	P7 Metrology P15 Nanostructures 1C Patterned Media
Kedar Patel	13.12	Costas Spanos	UC Berkeley	P7 Metrology 6C Directed Assembly II
Lin Zhao	13.00	Minghao Qi	Purdue University	P14 Nanophotonics P15 Nanostructures P18 Resists
Gregory Schardein	12.89	Todd Hastings	Univ. of Kentucky	1A Electon Beams I
Yiju Wang	12.86	Dmitri Litvinov	Univ. of Houston	P10 Nanobiology
Alex Raub	12.71	Steven Brueck	Univ. of New Mexico	P14 Nanophotonics 4C Directed Assembly I
Corey Fucetola	12.62	Hank Smith	MIT	P16 Novel Imaging
Hasan Korre	12.62	Karl Berggren	MIT	P16 Novel Imaging
Krutarth Trivedi	12.50	Walter Hu	Univ. of Texas at Dallas	8C Novel Imaging
Alborz Amirsadeghi	12.29	Sunggook Park	Louisiana State Univ.	P12 Nanoimprint
Dehu Cui	12.29	Xing Cheng	Texas A&M University	P12 Nanoimprint
Marshall Miller	12.29	Andy Neureuther	UC Berkeley	P9 Modeling
Chia-Yu Hu	12.14	Chun-Hung Lin	Nat'l Cheng Kung Univ. Taiwan	P2 Electron Beams
Yuduru Kase	11.75	Shahjada Pahlovy	Tokyo Univ. of Science Japan	P15 Nanostructures
Kang Hao Cheong	11.57	Anjam Khursheed	Nat'l Univ. of Singapore Singapore	P5 Focused Ion Beams

Student Support Grants

Student support was provided from 4 sources:

Raith USA	$2,500
NSF	$10,000
DoE	$15,000
EIPBN 2010	$27,500
	$55,000

NSF funds were solicited by Prof. Hank Smith of MIT, and DoE Department of Science funds were solicited by Prof. Reggie Farrow at the New Jersey Institute of Technology. Both

universities dispersed the full granted funds to EIPBN 2010 and waived any facilities and administration costs.

In years past, for locations where travel was less expensive and outside grants could support more students, the funding cutoff had been set at the limit of the amount received as grants. This year, to address the concerns with possible student non-participation, the Conference Chair and Program Chair agreed that full funding of as many students as reasonable should be a priority. The cutoff number, 66 students, was arrived at by counting the number of student volunteer jobs, and hoping that the students receiving support would show up and volunteer for these tasks.

Funding from US government agencies was distributed to students from a variety of universities within the US. An attempt was made to insure that funds were distributed evenly to a variety of institutions in many different states, and that no individual institution responsible for procuring funds was the recipient of support from those same funds. The students supported by individual grants are shown in Tables VI and VII.

Table VI: Students with EIPBN 2010 travel supported by funding from Dept. of Energy:

	State	University	Student	Amount
1	CA	University of California at Berkeley	Chris Clifford	$750
2	CA	Stanford University	Filip Crnogorac	$750
3	CA	California Institute of Technology	Mingyuan Huang	$750
4	GA	Georgia Institute of Technology	Nicole Devlin	$750
5	IL	Illinois Institute of Technology	Michael Wojcik	$750
6	IL	Illinois Institute of Technology	Anil Kumar	$750
7	LA	Louisiana State University	Naga Korivi	$750
8	MA	Massachusetts Institute of Technology	Katherine Harry	$750
9	MA	Massachusetts Institute of Technology	Vitor Manfrinato	$750
10	MI	University of Michigan	Yi-Kuei Wu	$750
11	NJ	Princeton University	Fei Ding	$750
12	NJ	Princeton University	Wen-Di Li	$750
13	NM	University of New Mexico	Alex Raub	$750
14	NY	Columbia University	Roger Piqueras Jover	$750
15	NY	Columbia University	Teresa Fazio	$750
16	TX	University of Texas at Dallas	Krutarth Trivedi	$750
17	TX	University of Texas at Dallas	Kyung-Hak Choi	$750
18	TX	Texas A&M University	Dehu Cui	$750
19	TX	Rice University	Ying Hu	$750
20	TX	University of Houston	Zhen Zheng	$750
			Total:	$15,000

Table VII: Students with EIPBN 2010 travel supported by funding from NSF:

	State	University	Student	Amount
1	CA	University of California at Berkeley	Marshall Miller	$750
2	CA	Stanford University	Bing Dai	$750
3	GA	Georgia Institute of Technology	Kevin Brenner	$750
4	IL	Illinois Institute of Technology	Edgar Palacios	$750
5	IN	Purdue University	Lin Zhao	$750
6	KY	University of Kentucky	Gregory Schardein	$750
7	LA	Louisiana State University	Precious Cantu	$750
8	MI	University of Michigan	Alex Kaplan	$750
9	NM	University of New Mexico	Svyatoslav Smolev	$750
10	NY	Columbia University	Erika Penzo	$750
11	NY	State University of New York at Albany	Heon Joon Choi	$750
12	TX	University of Texas at Dallas	Suresh Regonda	$250*
13	TX	University of Houston	Yiju Wang	$750
14	UT	University of Utah	Rajkumar Manthena	$750
			Total:	$10,000

* Partial support from NSF funding; additional $500 support provided by other EIPBN 2010.

IV. Peer Reviewed Publications from Students that Received Support

All participants that presented papers at the EIPBN 2010 Conference had the opportunity to submit journal articles to a special publication of the Journal of Vacuum Science and Technology B (JVSTB). JVSTB generally publishes those submitted articles that are accepted after peer review in the Nov/Dec issue of the same year as the conference. See JVSTB Vol. 28, No. 6 for the EIPBN 2010 published articles. The following is a list of the published articles of which supported students were at least one of the authors:

28 Published Papers from EIBPN Student Grant Recipients at US Universities

Robust estimation of line width roughness parameters, Kedar Patel, Soumendra N. Lahiri, and Costas J. Spanos, J. Vac. Sci. Technol. B **28**, C6H18 (2010); doi:10.1116/1.3517718
Hole mobility enhancement by chain alignment in nanoimprinted poly(3-hexylthiophene) nanogratings for organic electronics, Min Zhou, Mukti Aryal, Kamil Mielczarek, Anvar Zakhidov, and Walter Hu, J. Vac. Sci. Technol. B **28**, C6M63 (2010); doi:10.1116/1.3501343
Nanoimprinted P3HT/C60 solar cells optimized by oblique deposition of C60, Yi Yang, Mukti Aryal, Kamil Mielczarek, Walter Hu, and Anvar Zakhidov, J. Vac. Sci. Technol. B **28**, C6M104 (2010); doi:10.1116/1.3517513
Three-dimensional microfluidic mixers using ion beam lithography and micromachining, E. Palacios, L. E. Ocola, A. Joshi-Imre, S. Bauerdick, M. Berse, and L. Peto, J. Vac. Sci. Technol. B **28**, C6I1 (2010); doi:10.1116/1.3505128
Sub-10-nm half-pitch electron-beam lithography by using poly(methyl methacrylate) as a negative resist, Huigao Duan, Donald Winston, Joel K. W. Yang, Bryan M. Cord, Vitor R. Manfrinato, and Karl K. Berggren, J. Vac. Sci. Technol. B **28**, C6C58 (2010); doi:10.1116/1.3501353

Metrology for electron-beam lithography and resist contrast at the sub-10 nm scale, Huigao Duan, Vitor R. Manfrinato, Joel K. W. Yang, Donald Winston, Bryan M. Cord, and Karl K. Berggren, J. Vac. Sci. Technol. B **28**, C6H11 (2010); doi:10.1116/1.3501359, Online Publication Date: 22 November 2010

Nondestructive detection of deviation in integrated circuits, Leili Baghaei, Bing Dai, Piero Pianetta, and R. Fabian W. Pease, J. Vac. Sci. Technol. B **28**, C6Q25 (2010); doi:10.1116/1.3518464

Sub-10-nm half-pitch electron-beam lithography by using poly(methyl methacrylate) as a negative resist, Huigao Duan, Donald Winston, Joel K. W. Yang, Bryan M. Cord, Vitor R. Manfrinato, and Karl K. Berggren, J. Vac. Sci. Technol. B **28**, C6C58 (2010); doi:10.1116/1.3501353

Optical and computed evaluation of keyhole diffractive imaging for lensless x-ray microscopy, Bing Dai, Diling Zhu, Ronnachai Jaroensri, Kanokwan Kulalert, Piero Pianetta, and R. Fabian W. Pease, J. Vac. Sci. Technol. B **28**, C6Q1 (2010); doi:10.1116/1.3501340

Development of a simple, compact, low-cost interference lithography system, Hasan Korre, Corey P. Fucetola, Jeremy A. Johnson, and Karl K. Berggren, J. Vac. Sci. Technol. B **28**, C6Q20 (2010); doi:10.1116/1.3504498

Development of a simple, compact, low-cost interference lithography system, Hasan Korre, Corey P. Fucetola, Jeremy A. Johnson, and Karl K. Berggren, J. Vac. Sci. Technol. B **28**, C6Q20 (2010); doi:10.1116/1.3504498

Resonant coupling to a dipole absorber inside a metamaterial: Anticrossing of the, negative index response, Svyatoslav Smolev, Zahyun Ku, S. R. J Brueck, Igal Brener, Michael B. Sinclair, Gregory A. Ten Eyck, W. L. Langston, and Lorena I. Basilio, J. Vac. Sci. Technol. B **28**, C6O16 (2010); doi:10.1116/1.3503898

Analysis of surface electromagnetic wave resonant structures for potential application in an array of compact photoelectron sources, Heon J. Choi and Timothy R. Groves, J. Vac. Sci. Technol. B **28**, C6C63 (2010); doi:10.1116/1.3504590

Multilayer pattern transfer for plasmonic color filter applications, Alex F. Kaplan, Ting Xu, Yi-Kuei Wu, and L. Jay Guo, J. Vac. Sci. Technol. B **28**, C6O60 (2010); doi:10.1116/1.3511430

Plasma etch fabrication of 60:1 aspect ratio silicon nanogratings with 200 nm pitch, Pran Mukherjee, Alexander Bruccoleri, Ralf K. Heilmann, Mark L. Schattenburg, Alex F. Kaplan, and L. Jay Guo, J. Vac. Sci. Technol. B **28**, C6P70 (2010); doi:10.1116/1.3507427

Plasma etch fabrication of 60:1 aspect ratio silicon nanogratings with 200 nm pitch, Pran Mukherjee, Alexander Bruccoleri, Ralf K. Heilmann, Mark L. Schattenburg, Alex F. Kaplan, and L. Jay Guo, J. Vac. Sci. Technol. B **28**, C6P70 (2010); doi:10.1116/1.3507427

Hole mobility enhancement by chain alignment in nanoimprinted poly(3-hexylthiophene) nanogratings for organic electronics, Min Zhou, Mukti Aryal, Kamil Mielczarek, Anvar Zakhidov, and Walter Hu, J. Vac. Sci. Technol. B **28**, C6M63 (2010); doi:10.1116/1.3501343

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V. Conclusion

The 54th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication, 2010, held at the Egan Convention Center and Hilton in Anchorage, Alaska, June 1 to 4, 2010 was a great success in large part because financial support allowed robust participation from students. The students gave oral and poster presentations of their research and many published peer reviewed articles in a special conference issue of the Journal of Vacuum Science and Technology B. The Department of Energy Office of Basic Energy Sciences supported 20 students from US universities with a $15,000 grant (DE-SC0004873). On behalf of the Steering Committee of EIPBN I would like to thank DoE for its support of student participation at this very worthwhile conference.

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