

## APPENDICES

### APPENDIX A: BIOGRAPHIES OF PANELISTS AND OTHER TEAM MEMBERS

#### PANELISTS

**Name:** Vladimir Dmitriev, Panel Chair  
**Address:** TDI, Inc.  
 8660 Dakota Drive  
 Gaithersburg, MD 20877

Dr. Dmitriev has over 18 years of research experience in the epitaxial growth of wide bandgap semiconductors and device fabrication. He received his masters of science degree at Leningrad Electrotechnical Institute in 1978, Ph.D. in 1986 and Doctor in Science degree in 1996, both at the Ioffe Institute. His experience includes four years at Cree Research, Inc., where he was primarily responsible for the development of epitaxial process for III-V nitrides for blue light emitters. From 1992-96 he also directed Cree Research Eastern European Division, the Russian affiliate of Cree.

His particular interest is in mechanisms of epitaxial growth of semiconductors, and in the physics of wide bandgap semiconductor pn structures. He has published over 60 scientific papers and is co-inventor on eight USSR and three U.S. issued patents.

**Name:** T. Paul Chow  
**Address:** ECSE Department and Center for Integrated Electronics  
 Rensselaer Polytechnic Institute  
 Troy, NY 12180-3590

Dr. Chow received his B.A. (mathematics and physics, summa cum laude, 1975) from Augustana College, Sioux Falls, South Dakota, M.S. (Materials Science, 1977) from Columbia University, and Ph.D. (electrical engineering, 1982) from Rensselaer Polytechnic Institute, Troy, New York. From 1977-89 he worked at General Electric Corporate Research and Development, Schenectady, NY. He was first involved with developing CVD processes and characterization of doped tin oxide and indium oxide thin films for transparent electrode applications in solid-state imagers, and with refractory metals and metal silicides for MOS VLSI applications. From 1982 to 1989, he participated in the design and process development of various discrete and integrable MOS-gated unipolar and bipolar devices (such as the MOSFET, IGBT, and MCT), and in process architecture and integration of high-voltage integrated circuits. Since 1989, he has been on the faculty of the Electrical Systems and Computer Engineering Department of Rensselaer Polytechnic Institute as an associate professor.

His present research interests are in developing new device concepts and circuit models for high-voltage power devices and integrated circuits, process integration of ULSI metallization, and in process research of silicon and wide bandgap compound semiconductors. He has published over 50 papers in scientific journals, presented over 70 conference talks, contributed three chapters in technical textbooks and has over ten patents. He received the Solid State Science and Technology Young Author Award of the Electrochemical Society in 1982 and the Horizon Award from Augustana College in 1986. He is a senior member of the IEEE and a member of the Electrochemical Society. In 1990-97, he was the Editor for *Solid State Power* in the IEEE Transactions on Electron Devices. At present, he is the Chair of the Membership Committee of the IEEE Electron Devices Society.

**Name:** Steven P. DenBaars  
**Address:** Materials and ECE Depts.  
University of California  
Santa Barbara, CA 93106

Dr. DenBaars is a Professor of Materials and Electrical Engineering at the University of California, Santa Barbara. He received his Ph.D. Degree in Electrical Engineering from the University of Southern California in 1988 under the direction of Professor P.D. Dapkus. From 1988 to 1991 Professor DenBaars was a member of the technical staff at Hewlett-Packard's Optoelectronics Division involved in the growth and fabrication of visible LEDs.

His current research interests are in metal organic chemical vapor deposition (MOCVD) of III-V compound semiconductor materials and devices. Specific research interests include growth of wide bandgap semiconductors (GaN based), and their application to blue LEDs and lasers and high power electronic devices. This research has led to the first U.S. university blue laser demonstration and over seven patents pending on GaN growth and processing. He is the principal investigator of the DARPA-funded Multi-university Nitride Consortium, which will develop and transfer GaN technology to industry. In 1994 he received a NSF Young Investigator award. He has authored or co-authored over 75 technical publications, given 60 conference presentations and has ten patents.

**Name:** Michael S. Shur  
**Address:** Center for Integrated Electronics and Electronics Manufacturing  
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Dr. Shur received his MSEE degree (with honors) from St. Petersburg Electrotechnical Institute in 1965 while he received his Ph.D. in Physics (1967) and Doctor of Physics and Mathematics degree (1992) from Ioffe Institute. He has held research or faculty positions at A.F. Ioffe Institute, Wayne State University, Oakland University, Cornell University, IBM T.J. Watson Research Center and the University of Minnesota. In 1989-1996, he was John Marshal Money Professor at the University of Virginia, where he was also a member of the Center for Advanced Studies from 1989 to 1991 and the Director of the Applied ElectroPhysics Laboratories in 1996. Since 1996 he has been Patricia W. and C. Sheldon Roberts '48 Professor of Solid State Electronics at Rensselaer Polytechnic Institute, where he is also Associate Director of the Center for Integrated Electronics and Electronic Manufacturing. Dr. Shur has served as a consultant to major electronics companies, published more than 600 technical papers, has given many invited, keynote and plenary talks and lectures, authored, co-authored and edited 17 books and holds 25 patents on solid state devices.

He is a Fellow of IEEE, a Fellow of the American Physical Society, a member of Eta Kappa Nu and Tau Beta Pi, a member of the Electrochemical Society, SPIE, and Commission D (electronics and photonics) of the International Union of Radio Science. In 1987-96 he served as Secretary, Vice-Chair and Chair of the U.S. Commission D. In 1990-93 he served as an Associate Editor of *IEEE Transactions on Electron Devices*. He is now co-Editor-in-Chief of the *International Journal of High Speed Electronics and Systems* and Member, Honorary Advisory Board of *Solid State Electronics* magazine. He has also served as General Chair, Program Committee Chair, Committee Member, Session Chair and Organizer at many national and international conferences. In 1994, the Saint Petersburg State Technical University awarded him an Honorary Doctorate.

**Name:** Michael Spencer  
**Address:** 418 Phillips Hall  
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Ithaca, NY 14850

Dr. Michael Spencer, Professor of Electrical Engineering, Cornell University was born in Detroit, Michigan and raised in Washington, DC. Dr. Spencer has over fourteen years of research experience in the epitaxial and bulk growth of compound semiconductors such as GaAs, SiC and AlN (growth techniques include molecular beam epitaxy, vapor phase epitaxy, liquid phase epitaxy, and sublimation), microwave devices, solar cells and electronic materials characterization techniques (including deep level transient spectroscopy and photoluminescence). His particular interest has been in the correlation of device performance with material growth and processing parameters. Recent work has emphasized wide bandgap materials and Dr. Spencer's group was the first to produce conducting AlN and thick films of beta SiC grown by the bulk sublimation technique.

Dr. Spencer, has received a Presidential Young Investigator Award for 1985, the Alan Berman Research Publication Award from the Naval Research Laboratories in 1986 (for research leading to the first identification of a self interstitial defect in AlGaAs), the White House Initiative Faculty Award for Excellence in 1988, a Distinguished Visiting Scientist appointment at Jet Propulsion Laboratories in 1989 and a 1992 recipient of a NASA Certificate of Recognition. He received his B.S. and M.S. in Electrical Engineering and his Ph.D. in Electro-Physics from Cornell University. Dr. Spencer's experience includes two years at AT&T Bell Laboratories, where he supervised and managed the design, prototype production and manufacture of two different product lines of power rectifiers. Dr. Spencer has served as a research scientist and/or consultant to General Electric, the Naval Research Laboratories, Jet Propulsion Laboratories, Lawrence Livermore National Laboratories and (NASA) National Aeronautics and Space Administration.

He has authored over 50 publications in the area of compound semiconductor research. He has also presented numerous scientific papers. Dr. Spencer is on the permanent committee for the Electronic Materials Conference, the Compound Semiconductor Conference, as well as helped initiate and form the International Conference on Silicon Carbide and Related Materials. Dr. Spencer is currently one of the Directors of the NSF sponsored National Nano-Fabrication Network (NNUN). He currently has co-authored three U.S. patents with several patents pending.

## **OTHER TEAM MEMBERS**

**Name:** Usha Varshney  
**Address:** Program Director,  
Div. of Electrical and Communications Systems  
Directorate of Engineering  
National Science Foundation  
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Dr. Varshney received her B.Sc. Honors School and M.Sc. Honors School degrees from Panjab University. She was awarded the Ph.D. degree in Physics by the Indian Institute of Technology, New Delhi in 1983. She joined the National Science Foundation in 1997 as Program Director of the Physical Foundations of Enabling Technologies and Integrative Systems programs in the Division of Electrical and Communications Systems. She comes from an industrial background and maintains a strong interest in the interdisciplinary nature of scientific and engineering research. She has conducted research in industry/university/government cooperative programs. She has been involved with research in the areas of electro-ceramic materials and thin films for integrated microelectronic components and devices including non-volatile random access memories using ferroelectrics, uncooled focal plane arrays using pyroelectrics, radiation-resistant solar cells and photovoltaic devices using optoelectronic materials, thermal detectors and antennas using high T<sub>c</sub> superconducting fibers, thin and thick films, and flat panel displays using phosphors, magnetic materials, thin

films and devices including integrated planar magnetic components and circuits, monolithic magnetics for megahertz frequency high density power supplies and giant magnetoresistance sensors and devices. Dr. Varshney has also been involved with laser and plasma processing of materials and devices, and high temperature, high frequency wide bandgap semiconductor materials and associated devices including silicon carbide, aluminum nitride, diamond and iron titanates. She has a strong interest in the area of processing of bulk material, epitaxial growth of films and patterning techniques for high temperature electronic devices. She also has interests in electronic packaging and interconnections for high temperature applications, sensors, microelectromechanical systems (MEMS) and nanotechnology.