

International Workshop on Bulk Nitride Semiconductors

Program Schedule

Saturday, May 18th, 2002

9:00 a.m. – 8:00 p.m. - **Workshop Registration Desk**

7:00 - 9:00 p.m. - **Welcoming Reception** - Art Gallery, Tropical Hotel

Sunday, May 19th

8:00 a.m. – 4:00 p.m. - **Workshop Registration Desk**

Breakfast (Available in Tropical Hotel Restaurant from 6:00 a.m. to 10:00 a.m.)

10:00 a.m. - **Optional City Tour of Manaus** - This tour will give you a taste of the Manaus of the rubber boom days, as well as of the thriving metropolis that has made it such a coveted tourist destination today. Among the highlights of our tour are: the Indian Museum, displaying artifacts produced by tribes of the Upper Negro River; a regional handicraft exhibition with some items on sale; downtown with its floating harbour, which adjusts to the river's ever-changing levels; and the Art Nouveau cast-iron, turn-of-the-century Municipal Market where all imaginable regional goods are sold.

4:00 p.m.: **Transfer from the Tropical Pier to Ariau Jungle Tower Lodge** (arrive 5 p.m.)

7:00 p.m.: **Dinner at the Ariau Jungle Tower Lodge**

Monday, May 20th

7:15 a.m. - 8:15 a.m.: **Breakfast** - The Restaurant – Tower 7

Session 1: Approaches to GaN Single Crystal Growth (Chair: Z. Sitar)

The Auditorium – Tower 7

8:15 a.m. - 8:30 - **Welcome and Orientation** – Dr. Jaime Freitas, Zlatko Sitar & Prof. José Roberto Leite

8:30 a.m. - 9:00 a.m. (<i>Scene-setter</i>)	Grzegory, Izabella - Crystallization of Bulk GaN Under Pressure
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9:00 a.m. - 9:20 a.m.	D'Evelyn, Mark - Properties of Bulk GaN Crystals Grown at High Pressure and High Temperature
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9:20 a.m. - 9:40 a.m.	DiSalvo, Frank - Growth of Single Crystal GaN from Molten Sodium
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9:40 a.m. - 10:00 a.m.	Michaels, Emily - The Ammonothermal Synthesis of Bulk GaN Single Crystals
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10:00 a.m. - 10:20 a.m.	Bockowski, Michal - Directional Crystallization of GaN on Pressure Grown Substrates by Growth from Solution by HVPE
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Break: 10:20 a.m. - 10:30 a.m.

Session 2: Fabrication of GaN Wafers by HVPE I (Chair: F. DiSalvo)

10:30 a.m. - 11:00 a.m. (<i>Scene-setter</i>)	Lee, Seongkuk - HVPE GaN and Its Properties
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11:00 a.m. - 11:20 a.m.	Xu, Xueping - Low-Defect GaN Substrate Grown by HVPE
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11:20 a.m. - 11:40 a.m.	Paskova, Tanya - Growth and Separation Related Properties of HVPE-GaN Free-standing films
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11:40 a.m. - 12:00 noon	Liliental-Weber, Zuzanna - Comparison Between Structural Properties of Bulk GaN Grown Under High N Pressure and Grown by HVPE or MBE/HVPE
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12:00 noon - 12:20 p.m.	Freitas, Jaime - Donors in Hydride-vapor-phase Epitaxial GaN
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12:20 p.m. - 1:30 p.m. – **Lunch** – The Restaurant – Tower 7

Monday, May 20th, Continued

Session 3: Fabrication of GaN Wafers by HVPE II (Chair: C. Wood)

The Auditorium – Tower 7

1:30 p.m. - 2:00 p.m. (Scene-setter)	Kumagai, Yoshinao - <i>Thick and High Quality GaN Growth on GaAs (111) Substrates for Preparation of Freestanding GaN</i>
2:00 p.m. - 2:20 p.m.	Koukitu, Akinori - <i>Surface Polarity Dependence of Decomposition and Growth of GaN Studied by in situ Gravimetric Monitoring Method</i>
2:20 p.m. - 2:40 p.m.	Makarov, Yuri - <i>Modeling Analysis of HVPE of Quasi-bulk GaN Crystals in a Tubular Reactor</i>
2:40 p.m. - 3:00 p.m.	Kuech, Thomas - <i>Study on Sapphire Surface Preparation for III-Nitride Heteroepitaxial Growth by Chemical Treatment</i>
3:00 p.m. - 3:20 p.m.	Schineller, Bernd - <i>Multiwafer HVPE for the growth of gallium-nitride substrates</i>
3:20 p.m. - 3:40 p.m.	BRIEF DISCUSSION: <i>IS HVPE A VALID APPROACH TO PRODUCE LARGE-AREA ELECTRONIC-GRADE COMMERCIAL GaN SUBSTRATES?</i>

Break: 3:40 p.m. - 3:50 p.m.

Session 4: Issues in GaN Crystal Growth and Wafering (Chair: R. Schlessler)

3:50 p.m. - 4:20 p.m. (Scene-setter)	Dmitriev, Vladimir - <i>Properties of Bulk GaN Wafers and Homoepitaxial Layers</i>
4:20 p.m. - 4:40 p.m.	Sitar, Zlatko - <i>Growth of GaN Crystals from the Vapor Phase</i>
4:40 p.m. - 5:00 p.m.	Spencer, Mike – <i>High Temperature Decomposition of Gallium Nitride</i>
5:00 p.m. - 5:20 p.m.	Myers, Tom - <i>Use of High Temperature Hydrogen Annealing to Remove Subsurface Damage in Bulk GaN</i>

7:00 p.m. – **Dinner** – The Restaurant – Tower 7

8:30 p.m. - **Alligator Spotting** - Departure after dark in a motorized canoe with guide, in search of alligators called 'caimans'. Once they are paralyzed by the light of the flashlight, their eyes go red, enabling the guide to easily locate them. The guide will try to catch one of them with his bare hands and, depending on its size, bring it aboard the canoe for observation. Afterwards, the 'caiman' is safely returned to the water.

Tuesday, May 21st

5:30 a.m. - **Sunrise Canoe Expedition** - Depart from the lodge just as the sun is coming up. Traverse the river by motorized canoe as the forest wakes up around you.

7:30 - 8:30 a.m. **Breakfast** – The Restaurant – Tower 7

Session 5: Issues in AlN Crystal Growth (Chair: I. Grzegory)

The Auditorium – Tower 7

8:30 a.m. - 9:00 a.m. (Scene-setter)	Schlesser, Raoul - Bulk Growth of AlN Single Crystals from the Vapor Phase
9:00 a.m. - 9:20 a.m.	Yakimova, Rositza - Application of PVT to AlN Seeded Growth
9:20 a.m. - 9:40 a.m.	Edgar, Jim – Bulk AlN Crystal Growth: Self-seeding and Seeding on 6H-SiC Substrates
9:40 a.m. - 10:00 a.m.	Nause, Jeff - Bulk Nitride Crystal Growth and Substrate Preparation

Break 10:00 a.m. - 10:10 a.m.

Session 6: Bulk Growth Processes and Crystal Properties I (Chair: Z. Liliental-Weber)

10:10 a.m. –10:40 a.m. (Scene-setter)	Makarov, Yuri - Experimental and Theoretical Analysis of Kinetics of Growth of GaN and AlN Thick Epilayers and Bulk Crystals by Sublimation Sandwich Method
10:40 a.m. - 11:00 a.m.	Slack, Glen - Some Effects of Oxygen Impurities on AlN and GaN
11:00 a.m. - 11:20 a.m.	Zheleva, Tsvetanka - Temperature Variation of the Microstructural Properties of Aluminum Nitride Films
11:20 a.m. - 11:40 noon	Nemanich, Bob - Piezoresponse Force Microscopy for Piezoelectric Measurements and Polarity Imaging of III-Nitride Materials

11:40 p.m. - 1:00 p.m. **Lunch** – The Restaurant – Tower 7

Session 7: Bulk Growth Processes and Crystal Properties II (Chair: C. Litton)

1:00 p.m. - 1:30 p.m. (Scene-setter)	Dudley, Michael - Synchrotron White Beam Topography (SWBXT) Characterization of Physical Vapor Transport Grown AlN and Ammonothermal GaN
1:30 p.m. - 1:50 p.m.	Saarinen, Kimo - Vacancies as Compensating Centers in n-type and p-Type GaN
1:50 p.m. - 2:10 p.m.	Skromme, Brian - Optical Characterization of Bulk GaN Grown by a Na-Ga Melt Technique

3:00 p.m. **Visit to caboclo community, piranha fishing** - Visit a local "caboclo" (native Amazonian) community to view and learn about how the local people live in the rainforest. For piranha fishing, your guide will take you out by motorized canoe to try your hand at piranha fishing. The guide will supply poles and bait and, if you are lucky, maybe you can provide dinner!

7:00 p.m. - 9:30 p.m. - **Dinner and Show** - The show will be performed after dinner in the public auditorium "Rafael Grega" by a regional Boi Bumba Group with 20 dancers. The show allows for audience participation, so wear your dancing shoes!

Wednesday, May 22nd

7:30 a.m. - **Breakfast with the Biologist** - During breakfast, a local biologist will lead a briefing/discussion regarding the importance of the rainforest, its features, deforestation and the flora of the area. The Restaurant – Tower 7

9:00 a.m. - **Jungle Trekking** - Depart with your guide for a mild trek through the forest. Your guide will teach you about the flora and fauna you will see as well as survival and hunting techniques and life in the Amazon.

12:00 noon - 1:00 p.m. – **Lunch** – The Restaurant – Tower 7

Session 8: Nitride based devices and Superlattices (Chair: J. Leite)

The Auditorium – Tower 7

1:00 p.m. – 1:30 p.m. (Scene-setter)

Gaska, Remis - *Electronic and Optoelectronic Devices on Bulk GaN and Bulk AlN Substrates*

1:30 p.m. - 1:50 p.m.

Knap, Wojciech - *Properties of Two Dimensional Electrons in AlGaIn/GaN Heterostructures Grown on Bulk GaN Crystals*

1:50 p.m. - 2:10 p.m.

Prystawko, Pawel - *MOVPE Grown Laser Structures on Bulk GaN Crystals*

2:10 p.m. - 2:30 p.m.

Sipahi, Guilherme - *Calculations of Electronic and Optical Properties in p-doped AlGaIn/GaN Superlattices and Quantum Wells*

2:30 p.m. - 2:50 p.m.

Freire, Valder - *Interface Related Strong Exciton Energy Blue Shift in AlGaIn/GaN Quantum Wells*

2:50 p.m. - 3:10 p.m.

Alexandrov, Dimitar - *Excitons of the Structure in Wurtzite In(x)Ga(1-x)N and their Properties*

Break: 3:10 p.m. - 3:20 p.m.

Session 9: Alternative Substrates and New Trends (Chair: V. Dmitriev)

3:20 p.m. - 3:50 p.m. (Scene-setter)

Litton, Cole - *Bulk ZnO Substrate Development*

3:50 p.m. - 4:10 p.m.

Butcher, Scott – *Freestanding Low Temperature GaN Grown Using ZnO Buffer Layers*

4:10 p.m. - 4:30 p.m.

Maslar, James - *Structural Characterization of Homoepitaxial GaN Layers Using Raman Spectroscopy*

4:30 p.m. – 4:50 p.m.

Leite, José - *Optical Properties of Cubic GaN/Al_xGa_{1-x}N and GaN/In_xGa_{1-x}N Quantum Wells*

4:50 p.m. – 5:10 p.m.

Bechstedt, F - *Do we know the fundamental energy gap of InN?*

5:10 p.m. - 5:30 p.m.

Da Silva, Jr., Eronides - *Field Direction Related Anisotropy of the Electron Drift Velocity Overshoot in Wurtzite InN*

6:30 p.m. **Dinner** – The Restaurant

8:00 p.m. **Wrap-up Session** – The Auditorium

Thursday, May 23rd

7:00 a.m. – **Breakfast** – The Restaurant – Tower 7

8:30 a.m. - **Departure & Meeting of the Waters** - Travel by boat to the area where the fast moving black waters of the Rio Negro meet the slower brown waters of the Rio Solimões meet to form the Amazon proper. These two waters run together for miles without mixing as differences in speed, temperature and composition keep them separate. It is an amazing spectacle to behold.

12:45 p.m. - **Arrival at airport**