BORON NITRIDE WORKSHOP 2024

May 21st - 23rd

UTS Aerial Function Centre

University of Technology Sydney, Australia

WELCOME TO THE BORON NITRIDE WORKSHOP 2024

Dear Friends and Colleagues,

Welcome to Sydney, and to the 2nd Boron Nitride Workshop. We are excited to see our community grow, and thank you for taking part in this amazing journey.

Following the successful launch of the BNW series in Montpellier in 2023, this year, the scope of the workshop has expanded to include a dedicated session on cubic BN and energy applications. We are of course maintaining the broader scope of the workshop to include all key areas of research surrounding BN – spanning electronics, polaritonics, lighting, imaging, quantum, biology, materials science and theory.

We are also delighted to welcome attendees from 16 countries and we hope to see our global community grow in years to come. We hope you enjoy your time in Sydney and engage with the BN scientific community.

-Igor, Josh and Guillaume

UTS acknowledges the Gadigal people of the Eora Nation, the Boorooberongal people of the Dharug Nation, the Bidiagal people and the Gamaygal people, upon whose ancestral lands our university stands. We would also like to pay respect to the Elders both past and present, acknowledging them as the traditional custodians of knowledge for these lands.

BNW2024 Schedule

	Day 1 – Tuesday 21st May 2024
Time	**Location: Aerial Centre, UTS**
8:30	**Registration and welcome coffee**
9:00	**BNW2024 Opening remarks – Igor Aharonovich**
	Boron Nitride Devices | (Session Chair – Guillaume Cassabois)
9:20	***Invited Speaker –*** Siyuan Dai *"Engineering phonon polaritons in hBN van der Waals structures"*
9:50	***Contributed talk –*** Patrick Hopkins ***"****Ultrafast Thermal Dissipation via Surface Phonon Polaritons"*
10:10	***Contributed talk -*** Myungsoo Kim *"BN for memory, computing and radiofrequency switches"*
10:30	**COFFEE BREAK**
	Growth and Color Centres 1 | (Session Chair – Young Duck Kim)
11:10	***Invited Speaker –*** Wen Hao Chang *"CVD-grown hBN for 2D transistors and quantum emitters""*
11:40	***Invited Speaker –*** Jieun Lee *""Electrical control of light emission from h-BN single photon sources"*
12:10	***Contributed talk –*** Gyuna Park *"Room temperature EL from isolated colour centres in van der Waals semiconductors"*
12:30	**LUNCH**
	Computational Modelling | (Session Chair – Francisco Javier Muñoz Sáez)
14:00	***Invited Speaker –*** Viktor Ivady *"Computational exploration of hBN defects: insights into topological defects, spins, and emitters*
14:30	***Invited Speaker –*** Ludger Wirtz *"The electronic band structure of mono-, bi-, and trilayer h-BN"*
15:00	***Contributed talk –*** Sheng-Shong Wong *"Tuning color centers in hBN with sliding and twisting"*
15:20	***Contributed talk –*** Seokho Moon *"Wafer-Scale AA-Stacked Hexagonal Boron Nitride Grown on GaN Substrate"*
15:40	***Round table with Q&A, facilitated by the chairs of the session***
16:00	***Welcome Reception,*** **Aerial Centre, UTS**

BNW2024 Schedule

Day 2 – Wednesday 22nd May 2024

Location: Aerial Centre, UTS

Time	
	Growth and Color Centres 2 | (Session Chair – Andrzej Wysmolek)
9:00	***Invited Speaker –*** Young Duck Kim *"Manipulation of carbon color centers in hexagonal boron nitride"*
9:30	***Invited Speaker –*** Francisco Javier Muñoz Sáez *"Carbon-based single photon emitters in hBN and van der Waals heterostructures"*
10:00	***Contributed talk –*** Jonathan Bradford *"MBE of carbon-doped hBN on HOPG: Insights into the atomic structure of SPEs"*
10:20	***Contributed talk –*** Camille Maestre *"Searching for diffuse defects in millimetre-sized h-BN crystals"*
10:40	**COFFEE BREAK**
	Cubic Boron Nitride | (Session Chair – Ying (Ian) Chen)
11:10	***Invited Speaker –*** Kazuyuki Hirama *"c-BN epitaxial growth mechanism in ion-beam-assisted MBE"*
11:40	***Invited Speaker –*** Siddha PImpukar *"Growth of Bulk Boron Nitride"*
12:10	***Invited Speaker –*** Kaihui Liu *"Optical Crystals of Two-dimensional Rhombohedral Boron Nitride"*
12:40	**LUNCH**
	Spin defects in hBN | (Session Chair – Jieun Lee)
14:00	***Contributed talk –*** Tongcang Li "*Quantum sensing with single spin defects in boron nitride nanotubes"*
14:20	***Contributed talk –*** Ruotian Gong "*Enhancing Coherence Properties of Spin Defects in hBN"*
14:40	***Contributed talk –*** Kento Sasaki "*Nitrogen isotopes effects on hBN quantum sensor"*
15:00	***Contributed talk –*** Guillaume Cassabois "*Optical and spin properties of boron-vacancy centers in few-layer thick hBN"*
15:20	***Contributed talk –*** Islay Robertson "*Spin Properties of visible emitters in hBN*"
15:40	***Round table with Q&A, facilitated by the chair of the session + summary of the day***
16:00	***Poster session + Wine/Canapes,*** **Aerial Centre, UTS**

BNW2024 Schedule

Day 3 – Thursday 23rd May 2024

Location: Aerial Centre, UTS

Time	
	Growth Session Chair | (Session Chair – Wen Hao Chang)
9:00	***Invited Speaker –*** Andrzej Wysmolek *"MOVPE growth and applications of layered boron nitride"*
9:30	***Invited Speaker –*** Pengfei Yang *"Controllable growth of uniform multilayer hexagonal boron nitride on metals and insulators"*
10:00	***Contributed talk –*** Simonas Krotkus *"Interfacial engineering for wafer scale synthesis of multilayer sp2 -BN films"*
10:20	***Contributed talk –*** George Bepete *"Chemical intercalation, exfoliation, and functionalization of hBN materials"*
10:40	**COFFEE BREAK**
	hBN Nanophotonics | (Session Chair – Joshua Caldwell)
11:20	***Invited Speaker –*** Valentyn Volkov *"hBN Nanophotonics: UV Transparency, High Refractive Index and Optical Anisotropy"*
11:50	***Invited Speaker –*** Stefan Maier *"Tunability and applications of hBN metasurfaces"*
12:20	***Contributed talk –*** Lesley Spencer *"Monolithic Integration of Single Quantum Emitters in hBN Bullseye Cavities"*
12:40	**LUNCH**
	Future Applications of Boron Nitride | (Session Chair – Stefan Maier)
14:00	***Invited Speaker –*** Ying (Ian) Chen *"Boron nitride nanomaterials for energy applications"*
14:30	***Invited Speaker –*** Tomoki Machida *"hBN in van der Waals Heterostructures"*
15:00	***Contributed talk –*** Eveline Mayner *"Optical Readout of Redox Reaction via hBN Surface Emitters"*
15:20	***Contributed talk –*** Kristina Malinowski *"Photon statistics analysis of h-BN emitters with pulsed and cw excitation through Mandel Q"*
15:40	***Round table with Q&A, facilitated by the chair of the session + summary of the day***
16:00	***Concluding remarks and plans for Future hBN meetings***
17:30 -19:30	***BBQ Dinner, Universal Cafeteria (building 6)***

The Boron Nitride Workshop is proudly supported by:

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AIXTRON

OXFORD INSTRUMENTS

Poster Presentations

N°	Presenter name	Title
1	Sergei Nedic	*Electron Beam Restructuring of Quantum Emitters in Hexagonal Boron Nitride*
2	Guillaume Cassabois	*Spatially-resolved UV-C emission in epitaxial monolayer boron nitride*
3	Qiran Cai	*Thermal property and applications of boron nitride nanosheets*
4	Roy Styles	*The effect of electric fields on visible spin defects in hBN*
5	Guillaume Cassabois	*What is the nature of the UV color center emitting at 300 nm in hexagonal boron nitride ?*
6	Christopher J. Mellor	*Single photon emitters created by intentional carbon doping of hBN grown on sapphire by high-T MBE QUICK3*
7	Kabilan Sripathy	*– Towards satellite-based quantum communication, and fundamental physics tests in microgravity*
8	Rotem Malkinson	*Systematically creating boron vacancies in bulk exfoliated hBN flakes using focused ion beam*
9	Paul Konrad	*Quantum Sensors in hBN: Intersystem Crossing Relaxation of the Metastable State and Irradiation Protocol*
10	Jakub Rogoża	*Conductivity induced by post growth annealing of boron nitride grown by MOVPE*
11	Sonachand Adhikari	*hBN-Enabled Flexible GaN Photodetector*
12	Rajesh V Nair	*Isolated single photon emitters in hexagonal boron nitride at room temperature*
13	Jakub Iwański	*Polytype Identification in MOVPE Grown sp2-BN Using Ultraviolet Defect Photoluminescence*
14	Qiran Cai	*Boron nitride nanosheet aggregates for enhanced acoustic energy harvesting*
15	Hayoung Ko	*Growth of wafer-scale, high-quality, multilayer hBN on liquid Fe2B for high-performance of 2D heterostructure*
16	Pragya Joshi	*Carbon Migration and Single Photon Emission in Electron Irradiated hBN flakes*
17	Jong Sung Moon	*Fiber-integrated quantum sensors using color centers with optimal cavity interface*
18	Bindu Bindu	*Quantum Sensing and Imaging of van der Waals Ferromagnet using Nitrogen-Vacancy Centers*

19	Galya Haim	*Exploring methods for creation of Boron-vacancies in hexagonal Boron Nitride exfoliated from bulk crystal*
20	Momoko Onodera	*Evaluation of hexagonal boron nitride in van der Waals junctions of 2D materials*
21	Juliette Plo	*Nitrogen isotope effects on hexagonal boron nitride*
22	Min-Jae Maeng	*Transport band gap measurement of large-area hBN using direct and inverse photoemission spectroscopy*
23	Richard Escalante	*Sensitivity Optimization of Boron Vacancy Centers in Hexagonal Boron Nitride*
24	Andrew Beling	*Toward Nanoscale NMR Spectroscopy using the Boron Vacancy Quantum Defect in hBN*
25	Jake Horder	*Resonant Spectroscopy of B-Center Quantum Emitters in hBN*
26	Minhyun Cho	*Remote moire effect engineering using the twisted hBN*
27	YoungJae Kim	*High electric field vertical tunneling transports in hexagonal boron nitride*
28	Heeyeon Lee	*Hexagonal boron nitride surface engineering for remote modulation doping*
29	Shih-Chu Lin	*Defect engineering in CVD-Grown Hexagonal Boron Nitride for Quantum Photonic Applications*
30	Dominic Scognamiglio	*Controlling and stabilizing the Charge State of Spin Defects in hBN*
31	Seungmin Park	*High-efficiency deep ultraviolet emitting from hexagonal boron nitride heterostructure*
32	Nils Bernhardt	*UV defect emitters in thin hBN*
33	Helen Zeng	*Hexagonal Boron Nitride-Based Quantum Key Distribution with Room Temperature Single Photon Emission*
34	Benjamin Whitefield	*Magnetic Field Sensitivity Optimization of Negatively Charged Boron Vacancy Defects in hBN*
35	Karin Yamamura	*Plasmonic lattices-assisted emission enhancement and optimized creation of blue colour centre in hBN Solid*
36	Anand Kumar	*states quantum emitters in wide band gap materials for quantum technology applications*
37	Madeline Hennessey	*Towards Boron Nitride Nanotube Optical Emitters in Sensing Applications*
38	Ivan Zhigulin	*Photodynamics of electrically driven isolated colour centres in van der Waals semiconductors*
39	Ryan Kowalski	*Correlating Defect Emission with Infrared Near-Field Imaging in Strained Hexagonal Boron Nitride*

40	Wei Liu	*Coherent control of an ultrabright single spin in hexagonal boron nitride at room*
41	Piran Kidambi	*Temperature Nanoporous atomically thin ceramic membranes for energy and healthcare*
42	Takashi Taniguchi	*TBD*

The prize for the best poster presentation by a PhD student is supported by IOP MQT and 2D Materials journals.

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