

Carbon-based nanomaterials: from fundamental insights to applications

Sponsored by the COLL, ORGN, and PHYS Divisions

Organizers: Llius Blancafort, Nathan Gianneschi, and Jean-Philip Lumb

August 24-26, 2026

Monday AM

McCormick Place Convention Center W179b

J. Lumb, *Organizer, Presiding*

8:00 AM. Design and synthesis of melanin model compounds. **J. Lumb**

8:30 AM. Precision synthesis of graphene nanoribbon oligomers: from structural control to chiroptical function. **W. Chalifoux**

9:00 AM. Twisted Pentacenes: Materials for transistors and photonics applications.
K. Thorley, J.E. Anthony

9:20 AM. Intermission.

9:40 AM. Synthesis and preliminary characterization of property emergence in eumelanin dimers. **W. Bouthillier**, Y. Zhang, X. Wang, P. Sabbagh, J. Lumb

10:00 AM. Porous graphene nanoribbons and nanostructures. **A. Sinitskii**

10:30 AM. Intermission.

10:50 AM. Heterogeneous catalysts as electrochemical cells: Using proton buffers to close the circuit in nonaqueous media. **P. Kelly**, W. Jang, I.J. Garvey, S.S. Stahl

11:10 AM. Covalent stapling preserves excitonic coupling and chiroptical response in helical supramolecular perylene diimide polymers. **J. Maleszka**, I. Tsironi, S. Sooriyage, B. Rajapakshe, J. Rack, J. Olivier

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Monday PM

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C. Grieco, *Presiding*

2:00 PM. Polymers of alpha-lipoic acid: Fine-tuning properties through monomer composition and graphene incorporation. S. Pal, C. Cheng, S. Kim, **P.B. Messersmith**

2:30 PM. Toward understanding the synergistic effects of Mo-promoted Fe catalysts for crystalline carbon nanotube synthesis via methane pyrolysis. **S.L. Le**, M. Cargnello

2:50 PM. Intermission.

3:25 PM. Carbon nanodots: At the frontier of molecules and materials. **B. Bartolomei**

3:55 PM. Radical generation in eumelanin through the lens of model compounds.

P. Sabbagh, X. Wang, J. Lumb

4:15 PM. Common nanoscale structural motifs tune the photoproperties of melanin and natural organic matter. **B. Kohler**, G. McKay, M. Madhu, A. Ilina, B. Fornaciari, A. Vaidyanathan, H. Li

4:45 PM. Intermission.

5:00 PM. (Re)design of carbon-based plastics. **M. Golder**

5:30 PM. Precision nanocarbons in one and two dimensions: Twisted graphene nanoribbons and graphullerenes. **C.P. Nuckolls**

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L. Blancafort, *Presiding*

8:00 AM. Role of the interface and of irradiation in melanin formation. **M. Montalti**, D. Mordini, A. Menichetti, C. Mattioli, A. Pane, S. Vicenzi

8:30 AM. Melanin-inspired materials and computational approaches to modelling melanin oligomers. **M. Matta**

9:00 AM. Interchromophore coupling in few-layered nanostructures governs eumelanin photophysics. **M. Madhu**, V. Petropoulos, G. Cerullo, G. McKay, B. Kohler

9:20 AM. Intermission.

9:35 AM. Aggregated organic dyes for photocatalysis. **L. Dordevic**

10:05 AM. Electron-phonon coupling as the origin of CISS: A theoretical perspective. **Z. Shuai**

10:35 AM. Interfacial charge transfer dynamics in ceria-melanin hybrids. **P. Panthakkal Das**, B.S. Pham, B. Kohler

10:55 AM. Intermission.

11:10 AM. Impact of curvature on the electronic structure of 2D materials: From molecular motion to nonlocal cooperativity. **S. Banerjee**

11:40 AM. Molecular dynamics-driven modeling of carbon nanomaterials for energy absorption. **N. Faginas-Lago**, L. Mancini, A. Lombardi

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L. Blancafort and L. Dordevic, *Presiding*

2:00 PM. Methods for high-throughput screening and design of light-absorbing organic molecules. **K. Jorner**

2:30 PM. Charge transport through linear carbon atomic chains. **J.M. Morris**, J. Potter, E. Gorenskaia, T. Abram, M. Naher, C. Spano, R. Listo, E. Dixon, A. Sil, E. Rousset, S.J. Higgins, R. Nichols, P. Low, A. Vezzoli

2:50 PM. Electronic Shannon entropy as an effective descriptor of nonradiative dynamics in dense manifolds of excited states: Case study of C₂₀, C₆₀, C₇₀, C₇₆, C₈₄, C₈₆, and C₉₀ fullerenes. **K. Yasin**, M. Shakiba, A.V. Akimov

3:10 PM. Intermission.

3:30 PM. Fluorescence microscopy of single carbon dots. **S. Link**

4:00 PM. Unravelling the multi-state photoluminescence mechanism in red carbon dots: insights from time-resolved spectroscopy. M. Thapa, Y. Yadav, **A. Konar**

4:20 PM. Ultrafast semiquinone formation in 1,8-DHN allomelanin enables the decoupling of color and photophysical function. **V. Petropoulos**, L. Irie, D. Mordini, F. Montorsi, A. Menichetti, M. Maiuri, M. Garavelli, L. Valgimigli, m. montalti, G. Cerullo, N.C. Gianneschi

4:40 PM. Intermission.

5:00 PM. Probing electronic states in asphaltenes using ultrafast spectroscopy. **C. Grieco**, R. Spencer

5:30 PM. Towards a theoretical melanin platform. D. Bosch, A. Manickoth, G. Krishnan, J. Wang, **L. Blancafort**

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Wednesday AM

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Y. Wang, *Presiding*

8:00 AM. Carbon dots in action: Advancing from dye-sensitized solar cells to photocatalysis. **D. Guldi**

8:30 AM. Carbon nitride bearing persistent boryl radicals for doublet state photoredox catalysis. **C.A. Caputo**, R. Munasa, N. Mohseni

8:50 AM. Sub-2nm polyethylene quantum dots: A novel class of chemically intact hydrocarbon-based nanomaterials. **B. Naumann**, M. Reza

9:10 AM. Intermission.

9:30 AM. Carbon-based nanomaterials at biological interfaces: programming graphene quantum dot chirality from structure to therapy. **Y. Wang**

10:00 AM. Exploring the structure and optical function of pterin-based materials. **W. Dou**, L. Deravi

10:20 AM. Role of carbonyl functional groups in the physical and chemical properties of NOM. **R. Zhou**, B. Kohler, G. McKay

10:40 AM. Intermission.

11:00 AM. Nanomaterials in directed energy materials and adhesives. **T. Steele**

11:30 AM. Peptide materials for dry adhesives and solid-state reconfigurable structures. **R. Ulijn**

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N. C. Gianneschi, *Presiding*

2:00 PM. SSNMR of biosynthesized eumelanin: Synthetic pathways and purity.

N.K. Jayakody, **C.A. Klug**, M.O. Bovee, A.D. Smith, J.L. Dysart, M. Laskoski, E.R. Glaser, T.M. Hennessa, Z. Wang

2:30 PM. Topical synthetic melanin nanoparticles mitigate chemically induced skin injury and promote wound repair. **K. Lu**

3:00 PM. Optimizing synthetic melanin nanoparticles via surface modification for their use as topical treatments for acute skin injuries. **N. Paul**, D. Biyashev, U. Onay, Y. Hong, X. Zhou, M. Demczuk, S. Evans, K. Lu, N.C. Gianneschi

3:20 PM. Metallized melanin for the remediation of toxic nerve agents. **S. Aman**, S. Su, W. Xie, J. Cui, Z. Siwicka, X. Zhou, N.D. Rosenmann, K. Kirlikovali, M. Shawkey, O. Farha, N.C. Gianneschi

3:40 PM. Intermission.

4:00 PM. Characterizing and controlling electron flow through redox-active catecholic materials. **G.F. Payne**

4:30 PM. Programming optical disorder across a palette of allomelanin-inspired “Neo-allomelanin” pigments. **L. Irie**, V. Petropoulos, D. Mordini, W. Xie, S. Su, S. Aman, A. Kunningas, O.K. Farha, M. Shawkey, m. montalti, G. Cerullo, N.C. Gianneschi

5:00 PM. Chiral graphene quantum dots for selective transport across biological membranes. **F. Shirinichi**, Y. Liu, R. Zhu, J. Carpenter, W. Zhang, Y. Colon, Y. Wang

5:20 PM. Radical stabilized self-doped anthracene (AN):TCNQ charge-transfer co-crystal derived carbon nanothreads. **A. Mohamed**, B. Xu, A. Silakov, V. Crespi, E. Elacqua

5:40 PM. Concluding Remarks.