

6th International Symposium on Pathomechanisms of Amyloid Diseases

Dates: Dec. 4-6, 2024

Venue: B101, National High Magnetic Field Laboratory (MagLab), Florida State University, 1800 E Paul Dirac Dr, Tallahassee, FL 32310

Website: <https://nationalmaglab.org/news-events/events/for-scientists/symposium-on-pathomechanisms-of-amyloid-diseases/>

December 4, 2024 (Wednesday)

*Activities are planned to focus on providing education to beginners in the research area.

09:30 ~ 10:00 AM: Coffee, Meet & Greet

10:00 AM: Welcome & Introduction, (Rams) Ayyalusamy Ramamoorthy

Session-1: 10:05 AM – 12:00 noon

- “Liquid Liquid Phase Separation (LLPS)”, Martin Muschol, University of South Florida, Tampa
- “Biological Phase Separation – 100: Principles and Methods”, Vijayaraghavan Rangachari, University of Southern Mississippi
- “Application of MRI techniques for neurodegenerative diseases”, Varan Govind, University of Miami, Miami, FL
- “Magnetic Resonance Spectroscopy and X-nuclei (Sodium) Applied to Neurodegeneration”, Samuel Grant, NHMFL, FSU

12:00 ~ 1:00 PM: **Lunch** (in the reception area)

1:00 - 1:50 PM: **MagLab Tour** (Faith Scott and Malathy Ezhumalai)
(Divide the participants to form 2 groups – the tour starts from the Lobby)

Session-2: 2:00-3:30 PM

- “Probing aggregation by NMR”, (Rams) Ayyalusamy Ramamoorthy, NHMFL, FSU
- “Microscopic approaches to study aggregation”, Magdalena Ivanova, University of Michigan
- “Computational approaches to study aggregation”, Josh Mysona, Chemical & Biomedical, FSU

Session-3a: 3:30 ~ 4:00 PM

- “Preclinical MRI Data acquisition”, Shinho Cho (30 min) (at 900 MHz instrument)

4:00 - 4:30 PM **Coffee Break**

Session-3b: 4:25 - 5:30 PM

- “Solid-state NMR demo”, Samuel McCalpin & Riqiang Fu (30 min) (at 800 MHz instrument)
- “Biophysical data analysis”, Jhinuk Saha (30 min) (in Room B101)

5:30 PM Conference Reception

Dr. Stacey Patterson, Vice President for Research
Florida State University

- “Celebration of the birth of *International Society for Proteinopathies*”
& the Creation of Students Chapter, COE, FAMU-FSU

5:50-7:30 PM Dinner (in the MagLab lobby area)

Parallel Session, 2:00 ~ 4:00 PM

Mini-symposium on the Recent Advances in NMR Spectroscopy (B210, NHMFL)

Chair: Frederic Mentink-Vigier

- Bernd Reif, Technical University of Munich, Germany, "Proton-Detected Solid-State NMR Techniques" (~12+3 min)
- Songi Han, Northwestern University USA, "Overhauser DNP NMR to capture solvation water structure and dynamics on protein surfaces" (~12+3 min)
- Kenji Sugase, Kyoto University, Japan, "F1F2-selective solution NMR spectroscopy" (~12+3 min)
- Ansgar Siemer, University of Southern California, USA, "Solid-state NMR Techniques" (~12+3 min)
- Kendra Frederick, UT Southwestern Medical Center, USA, "Single particle analysis of cryo-EM data with solid-state NMR data in the frozen state" (~12+3 min)
- Robert Schurko, NHMFL, "NMR at the MagLab; NMR of Periodic Table" (~10 min)
- William Brey, NHMFL, "High Sensitivity solution NMR Probes for ^{13}C detection" (~5 min)
- Thierry Dubroca, NHMFL, "THz EPR with 36-Tesla High-Homogeneity Series-Connected Hybrid Magnet" (~5 min)
- Frederic Mentink-Vigier, NHMFL, "DNP Solid-State NMR" (~5 min)
- Tomas Orlando, NHMFL, "State-of-the-art and perspectives on DNP-enhanced liquid state NMR" (~5 min)
- Sungsool Wi, NHMFL, "Short- and Long-Range 2D ^{13}C - ^{13}C , ^{13}C - ^{15}N , ^{15}N - ^{15}N , ^1H - ^1H NMR Correlations in Peptide Groups Using $^{13}\text{C}/^{15}\text{N}$ -Labeled and Naturally Abundant Samples" (~5 min)

Dec. 5, 2024 (Thursday) (Each talk is for 17 min + 3 Q&A)

Welcome address: **Dr. Kathleen Amm**, Director, NHMFL

Session-4: 8:40 ~ 10:20 AM Chairs: Jennifer Lee & Varan Govind

- Corinne Lasmezas, Florida Atlantic University, “Targeting neuronal bioenergetics is a novel therapeutic approach for protein misfolding neurodegenerative diseases.”
- Holger Willie, University of Alberta, “Translating structural biology into rationally-designed vaccines for neurodegenerative diseases”
- Erwan Bezard, University of Bordeaux, “Differential pathological dynamics triggered by distinct Parkinson patient-derived α -synuclein extracts in non-human primates.”
- Rakez Kaye, University of Texas Medical Branch, “Clearance of intracellular tau protein pathology through novel immunotherapy approaches.”
- Tom Rothstein, Western Michigan University, “My quarter-century of fameFAIM: from apoptosis to proteostasis.”

10:20-10:40 AM **Coffee Break**

Session-5: 10:40 - 12:00 PM Chairs: Corinne Lasmezas & Holger Wille

- Gopal Thinakaran, University of South Florida, “Alzheimer’s disease risk factor BIN1 in tauopathy”
- Laura Blair, University of South Florid, “Tau’s Tamers: The Role of Molecular Chaperones in Slowing Tau Accumulation”
- Jin Hyung Lee, Stanford University, “Solving brain circuit function and dysfunction with computational modeling and optogenetic fMRI”
- Takahiro Muraoka, Tokyo University of Agriculture and Technology, “Protein-incorporating self-assembling peptides for injured brain regeneration”

12:00 - 1:00 PM **Lunch**

1:10 – 1:50 PM **MagLab Tour** (Fred Mentink and Sam Grant)
(Divide the participants to form 2 groups – the tour starts from the Lobby)

Session-6: 02:00 - 3:40 PM Chairs: Songi Han & Riqiang Fu

- Bernd Reif, Technische Universität München (TUM), “Aggregation kinetics and amyloid fibril structure probed by solution and MAS solid-state NMR spectroscopy”
- Kendra Frederick, University of Texas Southwestern Medical Center, “Structural Determination of Neurodegenerative Disease-Associated Proteins Inside Cells”
- Ansgar Siemer, University of Southern California, “Intrinsic disordered domains in amyloid fibrils: their structural ensemble and chaperone interactions.”
- Jean Baum, Rutgers University, “Mechanistic insight into α -synuclein aggregation and inhibition processes in neurodegenerative disease.”
- Sapun Parekh, University of Texas at Austin, “Quantifying amyloid polymorphism with microscopy and spectroscopy”

3:40 – 4:00 PM Flash Presentations (1 min per poster)

4:00 - 4:30 PM **Coffee Break**

Session-7: Special Topics: 04:30 – 5:15 PM (10+3 min per presentation)

Chairs: John Straub and Jean Baum

- Corinne Lasmezas, Florida Atlantic University, “Transmissibility of Amyloids”
- Holger Wille, University of Alberta, “Spread and Threat of CWD”
- Rakez Kayed, University of Texas Medical Branch, “The AD/ADRD interdisciplinary research network on biologically active tau aggregate polymorphs from Alzheimer’s disease and related dementias.”

Session-8: 05:15 – 6:00 PM Poster Session (MagLab, 2nd floor)

Chair: Sungsool Wi

06:00 ~ 7:30 PM **Dinner** (in the MagLab lobby area)

Dec. 6, 2024 (Friday)

Session-9: 9:00 - 10:20 AM

Chairs: Ansgar Siemer & Vijay Rangachari

- Ehud Gazit, Tel Aviv University, "Peptide-Metabolite Interactions and Metabolostasis in Amyloid Diseases"
- Sophie Lecomte, University of Bordeaux, "Tau selectively aggregates on membranes and induces membrane damage."
- Jennifer Lee, National Heart, Lung, and Blood Institute (NIH), "Water bend-libration as a Raman probe of intracellular amyloid fibrils."
- Gunnar Schröder, Forschungszentrum Jülich and University of Düsseldorf, "Cryo-EM studies of amyloid fibrils from mouse models."

10:20-10:40 AM

Coffee Break

Session-10: 10:40 - 12:00 PM

Chairs: Rakez Kayed & Magdalena Ivanova

- John Straub, Boston University, "Exploring the role of cholesterol, phase separation, and lipid rafts in the amyloid cascade and Alzheimer's disease."
- Thomas Caulfield, Mayo Clinic Jacksonville, "Leveraging AI-Driven Molecular Glue Design for Targeted Protein Degradation of Amyloid-Beta in Alzheimer's Disease Therapy."
- Songi Han, Northwestern University, "Role of Water in Directing Pathological Protein Aggregation"
- David Libich, University of Texas Health Science Center at San Antonio, "Liquid-liquid phase separation of the oncogenic fusion protein EWS:FLI1 is modulated by its DNA-binding domain."

Lunch: 12:00 - 1:20 PM

Session-11: 01:20 - 3:00 PM

Chairs: Bernd Reif & Kendra Frederick

- Anant Paravastu, Georgia Institute of Technology, "Distinguishing oligomeric assembly pathways from fibrillar assembly for the Alzheimer's amyloid- β peptide."
- Kenji Sugase, Kyoto University, "Site-Specific Kinetic Analysis of Protein Amyloid Fibrillation Under Flow Using High-Sensitivity Rheo-NMR"
- Lucie Khemtemourian, University of Bordeaux, "Insight into the cross-seeding molecular mechanism between the islet amyloid polypeptide and other amyloid-forming proteins."
- Dmitry Kourouski, Texas A&M University, "Elucidation of the role of fatty acids in the aggregation of amyloidogenic proteins."
- Eunsook Lee, Florida A&M, "REST as a new therapeutic target for neurodegenerative disorders: REST affords protection against manganese-induced neurotoxicity."

03:00-03:30 PM

Coffee Break

Session-9: 03:30 - 4:50 PM

Chairs: Anant Paravastu & Lucie Khemtemourian

- Jin Hae Kim, Daegu Gyeongbuk Institute of Science and Technology (DGIST), Korea, "Elucidation of the lipid-mediated aggregation mechanism of transthyretin"
- Takahiro Watanabe-Nakayama, Kanazawa University, "Single-molecule observation of tau aggregation"
- Kenjiro Ono, Kanazawa University, "Protofibrils of Amyloid- β are Important Targets of a Disease-Modifying Approach for Alzheimer's Disease."
- Christian Griesinger, Max Planck Institute, Göttingen, Germany, "Structures of aggregates relevant for treatment and diagnostics"

Concluding Remarks and Dinner