

IAEA-TM Agenda

May 30th

Morning Session

Session 1. Inverse Problems and Equilibrium Reconstruction

- 8:15 – 8:45 am Check-in and Registration
- 8:45 – 8:50 am Welcome
- 8:50 – 9:20 am Cianciosa (Invited): Uncertainty Analysis in 3D Equilibrium Reconstruction
- 9:20 – 9:45 am Xiao: 2D magnetic field diagnosed by Laser-driven Ion-beam Trace Probe
- 9:45 – 10:10 am Faugeras: Assimilation of polarimetry Stokes vector measurements in tokamak free-boundary equilibrium reconstruction with application to ITER
- 10:10 – 10:35 am Howell: Development of a Non-Parametric Gaussian Process Model in V3FIT
- 10:35 – 10:55 am Coffee Break**
- 10:55 – 11:20 am Skvara: Robust Bayesian linear regression for Tokamak plasma boundary estimation
- 11:20 – 11:45 am Lupelli: Recent updates in Machine-Agnostic EFIT++ Free Boundary Equilibrium Code
- 11:45 – 12:10 am Stagner: Determining the Population of Individual Fast-ion Orbits using Generalized Diagnostic Weight Functions

12:10 pm – 1:00 pm Lunch Break (Provided at site)

Afternoon Session

Session 2. Inverse Problems and Equilibrium Reconstruction Probability theory and statistical analysis/UQ

- 1:00 – 1:30 pm Chilenski (Invited): Bayesian inference of impurity transport coefficient profiles
- 1:30 – 1:55 pm Stankunas: Accurate Determination of Radiated Power Density Profile Using Bolometer Data for DT Baseline Scenario at JET
- 1:55 – 2:20 pm Ferreira : Full-pulse tomographic reconstruction with deep neural networks
- 2:20 – 2:45 pm Wang: Bayesian soft X-ray Tomography on Tore Supra and WEST
- 2:45 – 3:15 pm Discussion for Inverse Problems & Equilibrium Reconstruction
- 3:15 – 3:35 pm Coffee Break**

- 3:35– 4:00 pm Verdoolaege: Benchmarking robust regression techniques for global energy confinement scaling in tokamaks
- 4:00 – 4:25 pm Trask: Empirical Optimization with the Optometrist
Algorithm: Randomization Coupled With Expert Interpretation
- 4:25 – 4:50 pm Fujii: Machine Learning of Noise for LHD Thomson Scattering System
- 4:50 – 5:10 pm Discussion on Probability Theory & UQ

May 31st

Morning Session

Session 3. Model Selection Validation and Verification

- 8:00 – 8:25 am Ernst: Multichannel Validation of Gyrokinetic Simulations using a Synthetic Diagnostic for Doppler Backscattering based on Full-Wave Simulations
- 8:25 – 8:50 am Rodriguez – Fernandez: Validation of Quasilinear Transport Codes Via Machine Learning Strategies
- 8:50 – 9:15 am Howard: Validating Simulations of Multi-Scale Plasma Turbulence in ITER-Relevant, Alcator C-Mod Plasmas
- 9:15 – 9:40 am Vaezi: An Improved Approach to Uncertainty Quantification for Plasma Turbulence Validation Studies
- 9:40 – 10:05 am Michoski: Global Surrogates for the Upshift of the Critical Threshold in the Gradient for ITG Driven Turbulence

10:05 – 10:25am Coffee Break

- 10:25 – 10:50 am Jacobson: Validation of MHD Models using MST RFP Plasmas
- 10:50 – 11:15 am Reusch: Model Validation for Quantitative X-ray Measurements
- 11:15 – 11:40 am Mazon: GEM tomographic measurements for WEST and validation strategies
- 11:40 – 12:10 pm Discussion for Model Selection Validation and Verification

12:10 – 1:00 pm Lunch Break (Provided at site)

Afternoon Session: Session 4. Disruption prediction and pattern recognition

- 1:00 – 1:30 pm Ratta (Invited): AUG-JET cross-tokamak disruption predictor
- 1:30 – 1:55 pm Kates-Harbeck: Disruption Forecasting in Tokamak Fusion Plasmas using Deep Recurrent Neural Networks
- 1:55 – 2:20 pm Berkery: Disruption event characterization and forecasting of global and tearing mode stability for tokamaks
- 2:20 – 2:45 pm Vega: Increased warning times in JET APODIS disruption predictor by Using confidence qualifiers

2:45 – 3:05 pm	Coffee Break
3:05 – 3:30 pm	<u>Granetz</u> : Developing Universal Disruption Warning Algorithms Using Large Databases on Alcator C-Mod, EAST, and DIII-D
3:30 – 3:55 pm	<u>Rea</u> : Exploratory machine-learning studies for disruption prediction Using large databases on DIII-D
3:55 – 4:20 pm	<u>Ho</u> : Tokamak profile database construction incorporating Gaussian process regression
4:20 – 4:45 pm	<u>Churchill</u> : Finding structure in large datasets of particle distribution functions using unsupervised machine learning
4:45 – 5:10 pm	<u>Smith</u> : Identification of ELM evolution patterns with unsupervised clustering of time-series similarity metrics
5:10 – 5:40 pm	Discussion for Disruption Prediction and Pattern Recognition

June 1st

Morning Session

Session 5. Real time and Integrated Data Analysis

8:00 – 8:30 am	<u>Citrin (Invited)</u> : Realtime capable first principle transport modelling for tokamak prediction and control
8:30 – 8:55 am	<u>Meneghini</u> : Integrated infrastructure for the development of machine-learning models aimed at fusion applications
8:55 – 9:20 am	<u>Grierson</u> : Interpretive Analysis and Predictive Discharge Modeling with TRANSP
9:20 – 9:45 am	<u>Jakubowski</u> : Thermographic measurements of power loads to plasma facing components at Wendelstein 7-X
9:45 – 10:10 am	<u>Puig</u> : Wendelstein 7-X near real-time image diagnostic system for plasma facing components protection

10:10 – 10:30 am **Coffee Break**

10:30 – 10:55 am	<u>Logan</u> : OMFIT Tokamak Profile Data Fitting and Physics Analysis
10:55 – 11:20 am	<u>Kostuk</u> : Automatic between-pulse analysis of DIII-D experimental data performed remotely on a supercomputer at Argonne National Laboratory
11:20 – 11:45 am	<u>Kocan</u> : ITER Wide Angle Viewing System: Synthetic Measurements and Challenges of the Real-time Data Processing
11:45 – 12:10 pm	<u>Xu</u> : Data processing on application of real-time systems and validation of diagnostics in HL-2A

12:10 – 1:00pm **Lunch Break (Provided at site)**

Afternoon Session:

Session 6. Real time and Integrated Data Analysis Experimental Data Analysis and Synthetic Diagnostics

- 1:00 – 1:30 pm Salewski (Invited): Integrated data analysis of fast-ion measurements by velocity-space tomography
- 1:30 – 1:55 pm Wojenski: Advanced real-time data quality monitoring concept for GEM detector based SXR plasma diagnostics
- 1:55 – 2:20 pm Nornberg - Incorporating beam attenuation calculations into an Integrated Data Analysis model of plasma impurity content
- 2:20 – 2:50 pm Discussion for Real Time and Integrated Data Analysis
- 2:50 – 3:10 pm Coffee Break**
- 3:10 – 3:40 pm Kajita (Invited): Assessment and mitigation of wall light reflection in ITER by ray tracing
- 3:40 – 4:05 pm Yu: Data analysis and effect corrections of Phase Contrast Imaging diagnostic on HL-2A tokamak
- 4:05 – 4:30 pm Liu, Y.: Synthetic diagnostic for interpreting the ECE spectrum in LHW-heated plasmas on EAST
- 4:30 – 4:55 pm Liu, C.: Explanation of prompt growth of ECE signal in tokamak runaway electron experiments using ECE synthetic diagnostic
- 4:55 – 5:15 pm Discussion for Experimental Data Analysis and Synthetic Diagnostics
- 6:30 - 9:30pm **Banquet Dinner at Top of the Hub – Boston, MA**

June 2nd

Morning Session

Session 7. Data Management/handling

- 8:00 – 8:30 am Marzouk (Invited): Computational advances for Bayesian inference and optimal experimental design
- 8:30 – 8:55 am Pinches: IMAS Updates
- 8:55 – 9:20 am Lupelli: The SAGE Project: A paradigm shift in the Storage Systems for Data Centric Computing
- 9:20 – 9:45 am Smith, S.: OMFIT (One Modeling Framework for Integrated Tasks): An Efficient Community Driven Integrated Modeling Framework
- 9:45 – 10:10 am Greenwald: Navigational Data Management

10:10 – 10:30 am **Coffee Break**

10:30 – 10:55 am Zabeo: Diagnostic Data Handling in the PCS

10:55 – 11:20 am Emoto: Improvement of Automatic Physics Data Analysis Environment for the LHD Experiment

11:20 – 11:45 am Kim: Development of unified data analysis in KSTAR

11:45 – 12:10 pm de Witt: A Comparison of Data Management Techniques Across Different Science Disciplines

12:10 – 12:40 pm Discussion for Data Management & Meeting Closing