

# MONDAY – SESSION 1

## ASTROPHYSICAL DATA VISUALIZATION FROM LINE PLOTS TO AUGMENTED AND VIRTUAL REALITY

### Invited and Contributed

08.40 – 09.00 Amitabh Varshney (Univ. of Maryland)

**Astronomy-inspired Visual Computing**

09.00 – 09.30 Brian Kent (NRAO)

**3D Data Visualization in Astrophysics**

09.30 – 09.45 Christopher Zapart (NAOJ)

**An introduction to FITSWebQL**

09.45 – 10.00 Angus Comrie (Univ. of Cape Town)

**An HDF5 Schema for SKA Scale Image Cube Visualization**

10.00 – 10.15 Emanuel Ramirez (Quasar Science Resources)

**Analysis of Astronomical Data using VR: the Gaia catalogue in 3D**

### Focus Demo

10.45 – 11.15 Alexandar Mechev (Leiden University)

**Building LOFAR As A Service: Processing Petabytes with just a click**

# MONDAY – SESSION 2

## ALGORITHMS

### Invited and Contributed

11.15 – 11.45 James Bosch (Princeton U./LSST)

**An Overview of the LSST Image Processing Pipelines**

11.45 – 12.00 Amanda Kepley (NRAO)

**Auto-multithresh: A General Purpose Automated Masking Algorithm for Clean**

12.00 – 12.15 Daniele Tavagnacco (INAF-OATs)

**Performance-related aspects in the Big Data Astronomy Era: architects in software optimization**

12.15 – 12.30 Lightning Talks

# MONDAY – SESSION 3

## QUALITY ASSURANCE OF SCIENCE DATA

### Invited and Contributed

14.00 – 14.15 Nadia Dencheva (STScI)

**GWCS - A General Approach to Astronomical World Coordinates**

14.15 – 14.30 Cheuk Yin Lam (Liverpool Telescope)

**Data-Driven Pixelisation with Voronoi Tessellation**

14.30 – 15.00 Ray Plante (NIST)

**The BagIt Packaging Standard for Interoperability and Preservation**

### Focus Demo

15.30 – 16.00 Michael Raddick (Johns Hopkins U.)

**SciServer: Collaborative data-driven science**

## MONDAY – SESSION 4

### QUALITY ASSURANCE OF SCIENCE DATA (CONTINUED)

#### Invited and Contributed

16.00 – 16.15 Rosa Diaz (STScI)

**Adding Science Validation to the JWST Calibration Pipeline.**

16.15 – 16.30 Gilles Landais (CDS/ObAS)

**Quality assurance in the ingestion of data into the CDS VizieR catalogue and data services**

16.30 – 16.45 Franois Bonnarel (CDS/ObAS)

**ProvTAP: A TAP service for providing IVOA provenance metadata**

16.45 – 17.00 Lightning Talks

#### Birds of Feather

*SALON AB*

17.15 – 18.15 Jessica Mink (CfA)

**Data Formats**

18.15 – 19.15 August Muench (AAS)

**Data Citation: from Archives to Science Platforms**

*SALON G*

17.15 – 18.15 Eric Tollerud (STScI)

**Open Source/Development Software Projects and Large Organizations/Missions: Recommendations and Challenges**

18.15 – 19.15 Kai Polsterer (HITS)

**Beginners Guide to Machine Learning in Astronomy**

## TUESDAY – SESSION 5

### DATABASES AND ARCHIVES: CHALLENGES AND SOLUTIONS IN THE BIG DATA ERA

#### Invited and Contributed

09.00 – 09.30 Felix Stoehr (ESO/ALMA)

**Astronomical archives: Serving up the Universe**

09.30 – 09.45 Clara Brasseur (STScI)

**AstroCut: A cutout service for TESS full-frame image sets**

09.45 – 10.00 Petar Zecevic (Univ. of Zagreb)

**AXS: Making end-user petascale analyses possible, scalable, and usable**

10.00 – 10.15 Nicolas Buchschacher (Univ. of Geneva)

**No-SQL databases: An efficient way to store and query heterogeneous astronomical data in DACE.**

#### Focus Demo

10.45 – 11.15 Emmanuel Joliet (IPAC/Caltech)

**Visualization in IRSA Services using Firefly**

## TUESDAY – SESSION 6

### DATA SCIENCE: WORKFLOWS, HARDWARE, SOFTWARE, HUMANWARE

#### Invited and Contributed

11.15 – 11.45 Kirk Borne (Booz Allen Hamilton)

**Massive Data Exploration in Astronomy: What Does Cognitive Have To Do With It?**

11.45 – 12.00 Ignacio Toledo (Joint ALMA Observatory)

**Data Science =! Software Engineering. Exploring a workflow for ALMA operations.**

12.00 – 12.15 Takeshi Nakazato (NAOJ)

**New Synthesis Imaging Tool for ALMA based on the Sparse Modeling**

12.15 – 12.30 Lightning Talks

# TUESDAY – SESSION 7

## MACHINE LEARNING IN ASTRONOMY

### Invited and Contributed

14.00 – 14.30 Maggie Lieu (ESA)

**Deep learning of astronomical features with big data.**

14.30 – 14.45 Megan Ansdell (UC Berkeley)

**Automatic Classification of TESS Planet Candidates using Deep Learning**

14.45 – 15.00 Bojan Nikolic (Univ. of Cambridge)

**Acceleration of Non-Linear Minimisation with PyTorch**

### Focus Demo

15.30 – 16.00 John Good (Caltech/IPAC-NExScI)

**Image Processing in Python With Montage**

## TUESDAY – SESSION 8

### MULTI-MESSENGER ASTRONOMY

#### Invited and Contributed

16.00 – 16.15 Sankalp Gilda (Carnegie Mellon University)

**Importance of Feature Selection in ML models**

16.15 – 16.30 Cong Dai (Beijing Normal University)

**TBD**

16.30 – 17.00 Erik Kuulkers (European Space Agency)

**Coordinating observations among ground and space-based telescopes in the multi-messenger era**

#### Birds of Feather

*SALON AB*

17.15 – 18.15 Simon O’Toole (AAO-MQ)

**How do you get the most out of your teams?**

*SALON G*

17.15 – 18.15 Peter Shawhan (Univ. of Maryland)

**Data analysis challenges for multi-messenger astrophysics**



## WEDNESDAY – SESSION 9

### DATABASES AND ARCHIVES (CONTINUED)

#### Invited and Contributed

09.00 – 09.15 Beatriz Martinez (Rhea Systems S.A.)

**Data-driven Space Science at ESA Science Data Centre**

09.15 – 09.30 Simon O'Toole (AAO-MQ)

**Bringing together the Australian sky - coordination and interoperability challenges of the All-Sky Virtual Observatory**

09.30 – 09.45 Juan Gonzalez-Nuñez (European Space Agency)

**Driving Gaia Science from the ESA Archive: DR2 to DR3**

09.45 – 10.00 Sarah Graves (East Asian Observatory)

**Harnessing the power of archival data to increase scientific output: the JCMT experience.**

10.00 – 10.15 Alice Allen (Astrophysics Source Code Libr)

**Toward common solutions for data access, discovery and interoperability**

#### Focus Demo

10.45 – 11.15 Karan Vahi (Pegasus Team - USC/ISI)

**Workflows Management using Pegasus**

# WEDNESDAY – SESSION 10

## TIME DOMAIN ASTRONOMY

### Invited and Contributed

11.15 – 11.30 Hackathon Prizewinner

11.30 – 12.00 Ada Nebot (CDS/ObAS)

**Data challenges of the VO in Time Domain Astronomy**

12.00 – 12.15 Mario Juric (Univ. of Washington)

**The ZTF Alert Stream: Lessons from the first six months of operating an LSST precursor**

12.15 – 12.30 Lightning Talks

# WEDNESDAY – SESSION 11

## SOFTWARE FOR SOLAR SYSTEM ASTRONOMY

### Invited and Contributed

14.00 – 14.30 Matthew Holman (CfA)

**The Minor Planet Center Data Processing System**

14.30 – 14.45 Elena Racero (ESAC - Serco)

**ESASky: A New Window for Solar System Data Exploration**

14.45 – 15.00 Anne Raugh (Univ. of Maryland)

**The PDS Approach to Science Data Quality Assurance**

## WEDNESDAY – SESSION 12

### SCIENCE PLATFORMS: TOOLS FOR DATA DISCOVERY AND ANALYSIS FROM DIFFERENT ANGLES

#### Invited and Contributed

16.00 – 16.30 Ivelina Momcheva (STScI)

**Hubble in the Cloud: A Prototype of a Science Platform at STScI**

16.30 – 16.45 Michael Fitzpatrick (NOAO)

**The NOAO Data Lab: Design, Capabilities and Community Development**

16.45 – 17.00 Tom Donaldson (STScI)

**Astropy and the Virtual Observatory**

#### Birds of Feather

*SALON AB*

17.15 – 18.15 Alice Allen (Astrophysics Source Code Libr)

**Unconference Session: I want to talk about...**

## THURSDAY – SESSION 13

### DEVOPS PRACTICES IN ASTRONOMY SOFTWARE

#### Invited and Contributed

09.00 – 09.30 Rocio Guerra Noguero (European Space Agency)

**DevOps: the perfect ally for Science Operations for a large and distributed astronomy project.**

09.30 – 09.45 Marcel Loose (ASTRON)

**Agile and DevOps from the trenches at ASTRON**

09.45 – 10.00 Jeffrey Smith (SETI Institute)

**Lilith: A Versatile Instrument and All-Sky Simulator for use with Space-Based Astrophysics Observatories**

10.00 – 10.15 Malik Olivier Boussejra (Keio Univ.)

**aflak: Pluggable Visual Programming Environment with Quick Feedback Loop Tuned for Multi-Spectral Astrophysical Observations**

## THURSDAY – SESSION 14

### MANAGEMENT OF LARGE SCIENCE PROJECTS

#### Invited and Contributed

11.15 – 11.45 Michael Wise (ASTRON)

**Establishing the SKA Regional Centre Network: Mesh Management and Culture Change**

11.45 – 12.00 Anastasia Alexov (STScI)

**Hit the Ground Running: Data Management for JWST**

12.00 – 12.15 Maurizio Tomasi (Univ. degli Studi di Milano)

**Towards new solutions for scientific computing: the case of Julia**

12.15 – 12.30 BOF Lightning Summaries