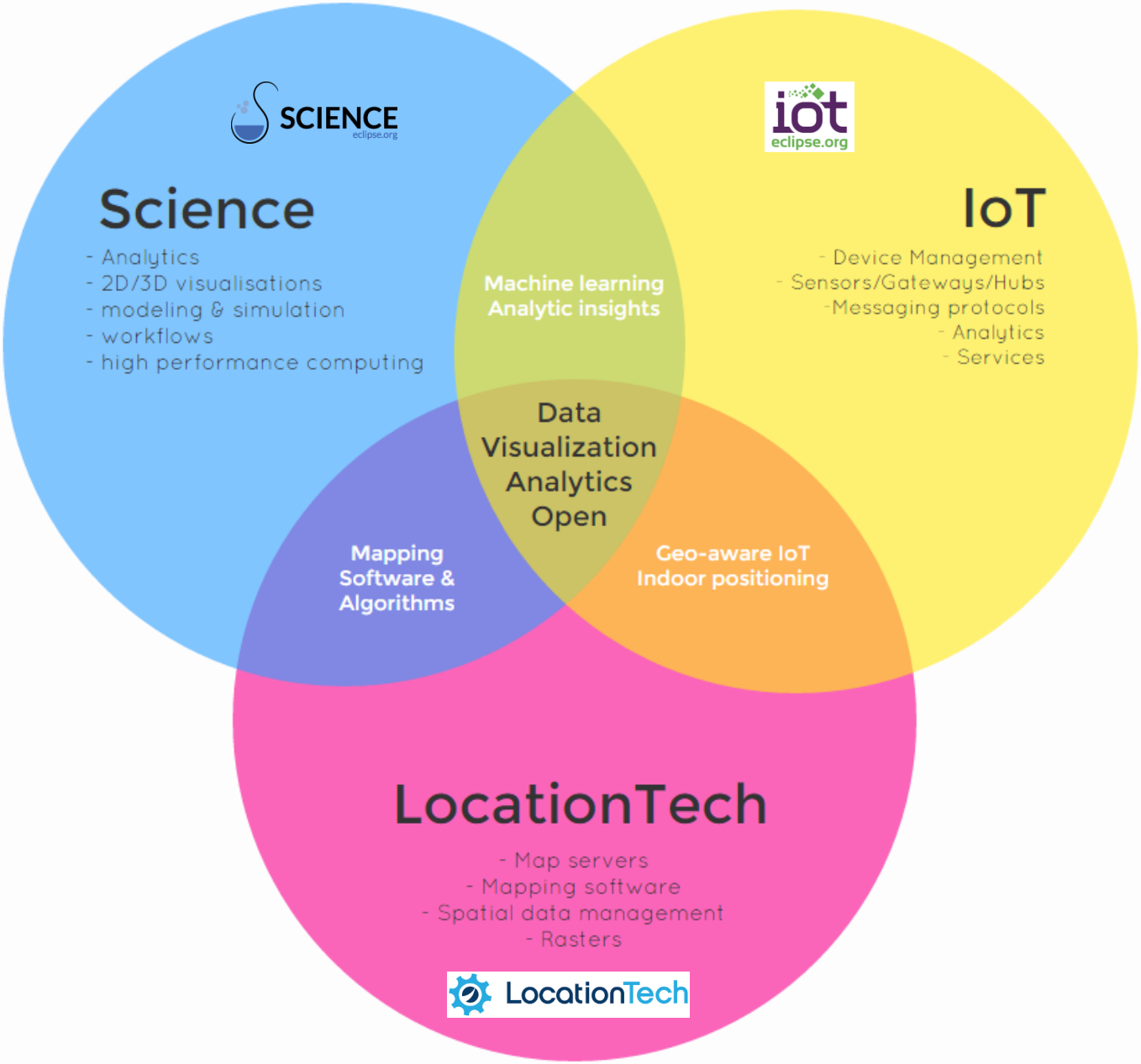
Tracy Miranda, Kichwa Coders, NOBUGS 2016

Advancing Science with Open Source Software

The Story Of Eclipse…

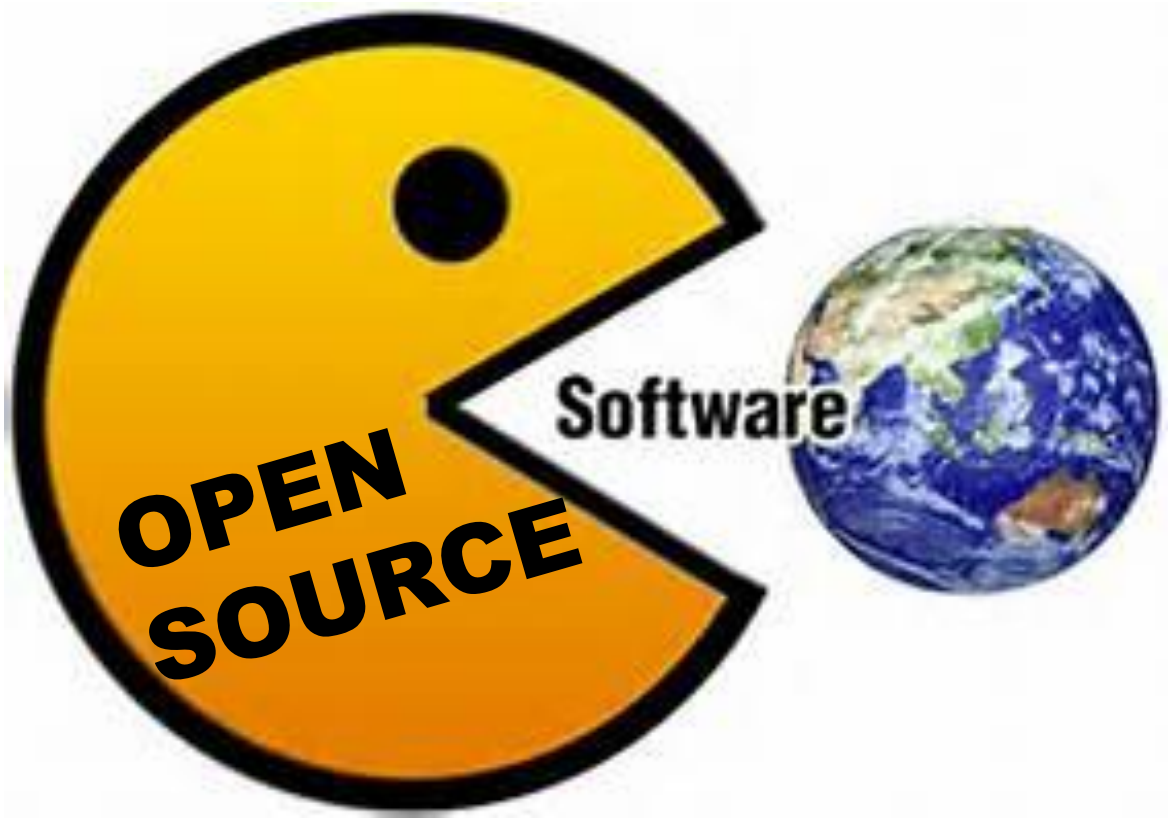
- Late '90s Tool Landscape
  - Microsoft vs Java
- IBM /Object Technology International (OTI)
  - Release an open source Eclipse IDE in 2001
- Eclipse Foundation created
  - EclipseCon 2004, eclipse community developed
  - 8 Strategic members, >100 other members

Eclipse Working Groups


SCIENCE
eclipse.org
Science
- Analytics
- 2D/3D visualisations
- modeling & simulation
- workflows
- high performance computing
iot
eclipse.org
IoT
- Device Management
- Sensors/Gateways/Hubs
- Messaging protocols
- Analytics
- Services
Machine learning
Analytic insights
Data
Visualization
Analytics
Open
Mapping
Software &
Algorithms
Geo-aware IoT
Indoor positioning
LocationTech
- Map servers
- Mapping software
- Spatial data management
- Rasters
LocationTech

Software Is Eating The World

Open Source Has Won



Open Source Software Trends

CLOSED	⇨	INCLUSIVE
OPAQUE	⇨	TRANSPARENT
CENTRALIZED	⇨	DECENTRALIZED
TOP DOWN	⇨	BOTTOM UP

What About Science?

CLOSED	⇨	INCLUSIVE
OPAQUE	⇨	TRANSPARENT
CENTRALIZED	⇨	DECENTRALIZED
TOP DOWN	⇨	BOTTOM UP

Eclipse Working Groups

Eclipse Foundation

"Open Source Governance"

- IP Management
- Development Processes
- Licensing Model
- Forge & Build
- Community
- Member Network

Challenges for Scientific Software

- Integration
- Scaling for bigger quantities of data
- Reproducibility
- Resources

Science Working Group

Steering Committee

Participating

5 Great Scientific Workbenches

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5 Eclipse tools for processing and visualizing data

Posted 25 Apr 2016 by Tracy Miranda

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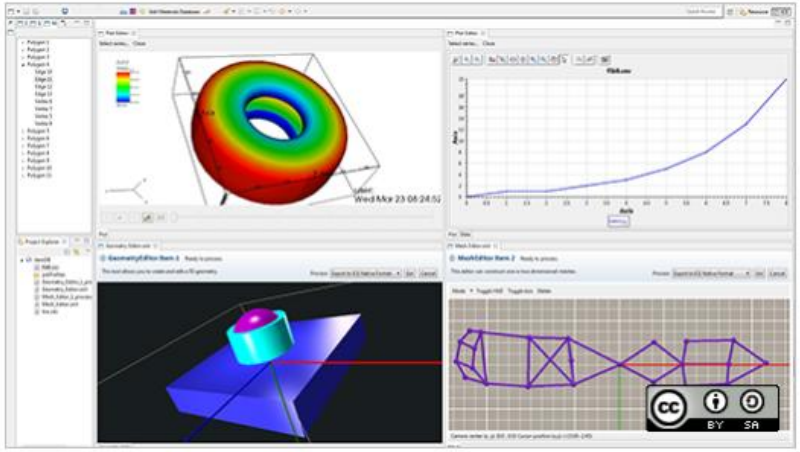

Image credits :

UT-Batelle: Photo of Eclipse Advanced Visualisation Project with plots, 3D data, geometry and mesh editors.

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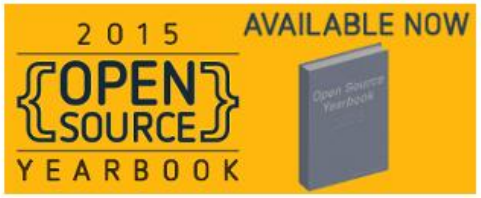
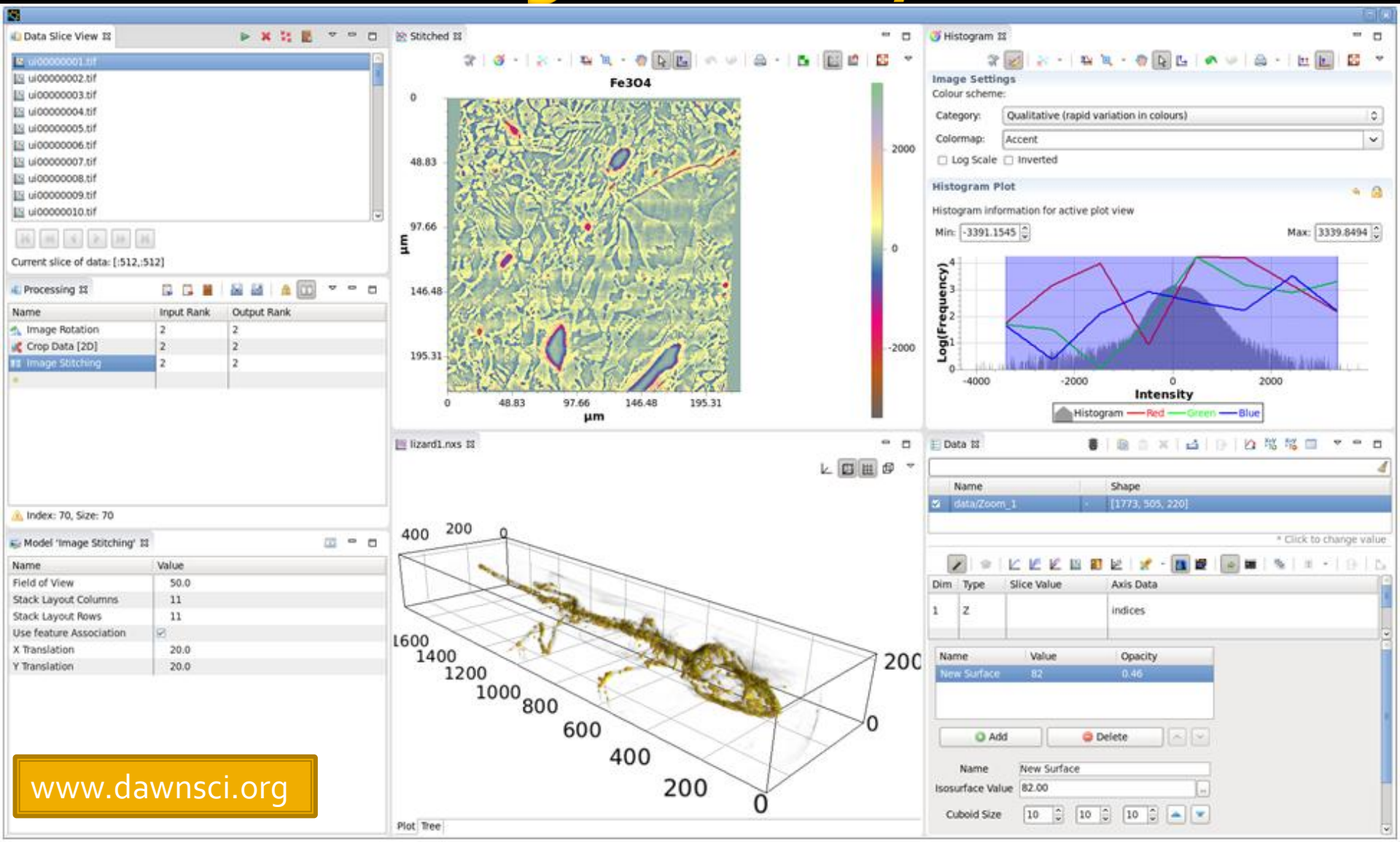
Tracy Miranda is a software developer and founder of Kichwa Coders, a software consultancy specializing in Eclipse tools for scientific and embedded software. Tracy has been using Eclipse since 2003 and is actively involved in the community, particularly the Eclipse Science Working Group. Tracy has a background in electronics system design. She mentors young coders at the festival of code for Young Rewired State. Follow Tracy on Twitter @tracymiranda.

» More about me



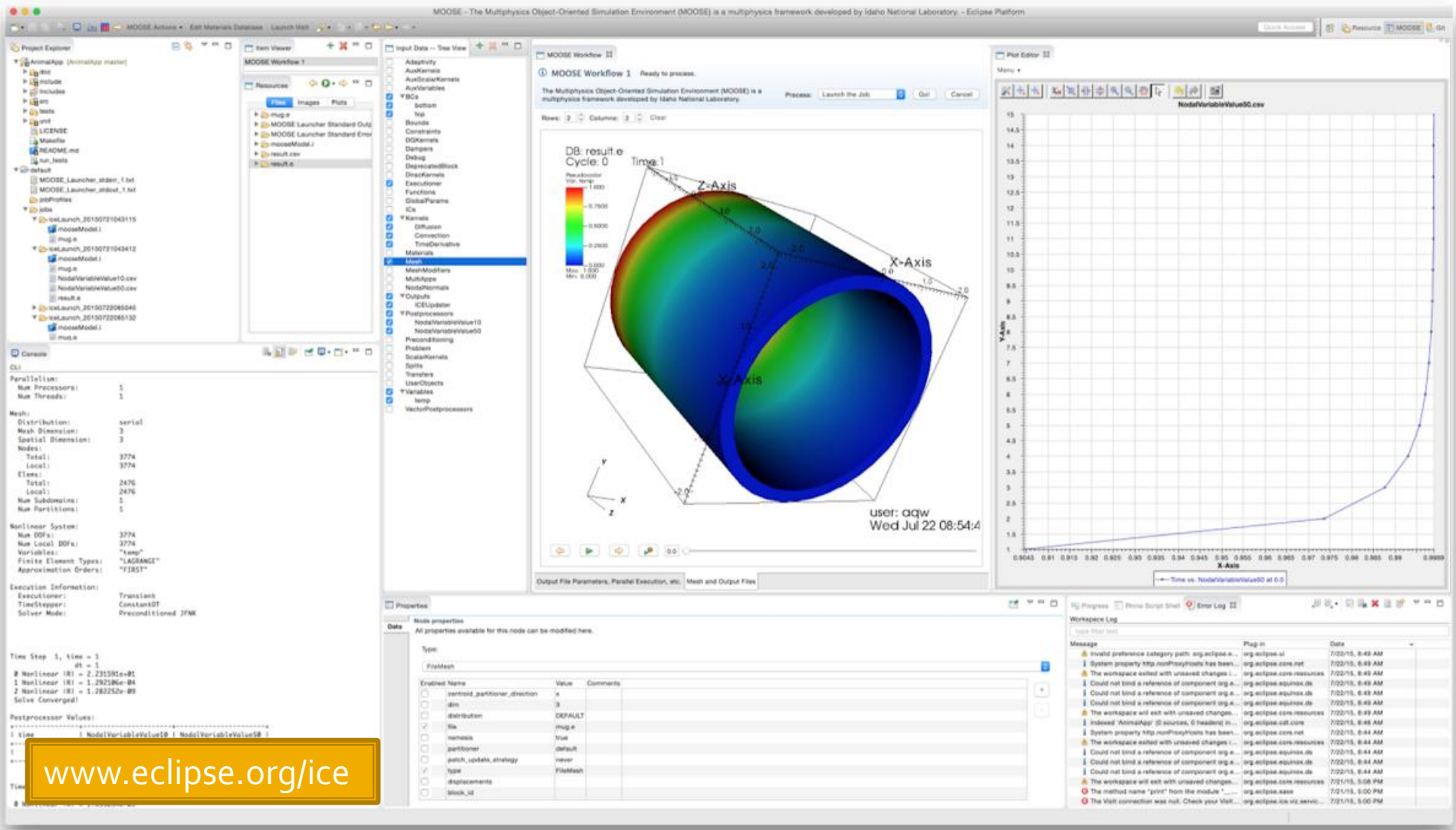
opensource.com/education/16/4/5-great-eclipse-scientific-workbenches

Data Analysis Workbench - Diamond Light Source, UK

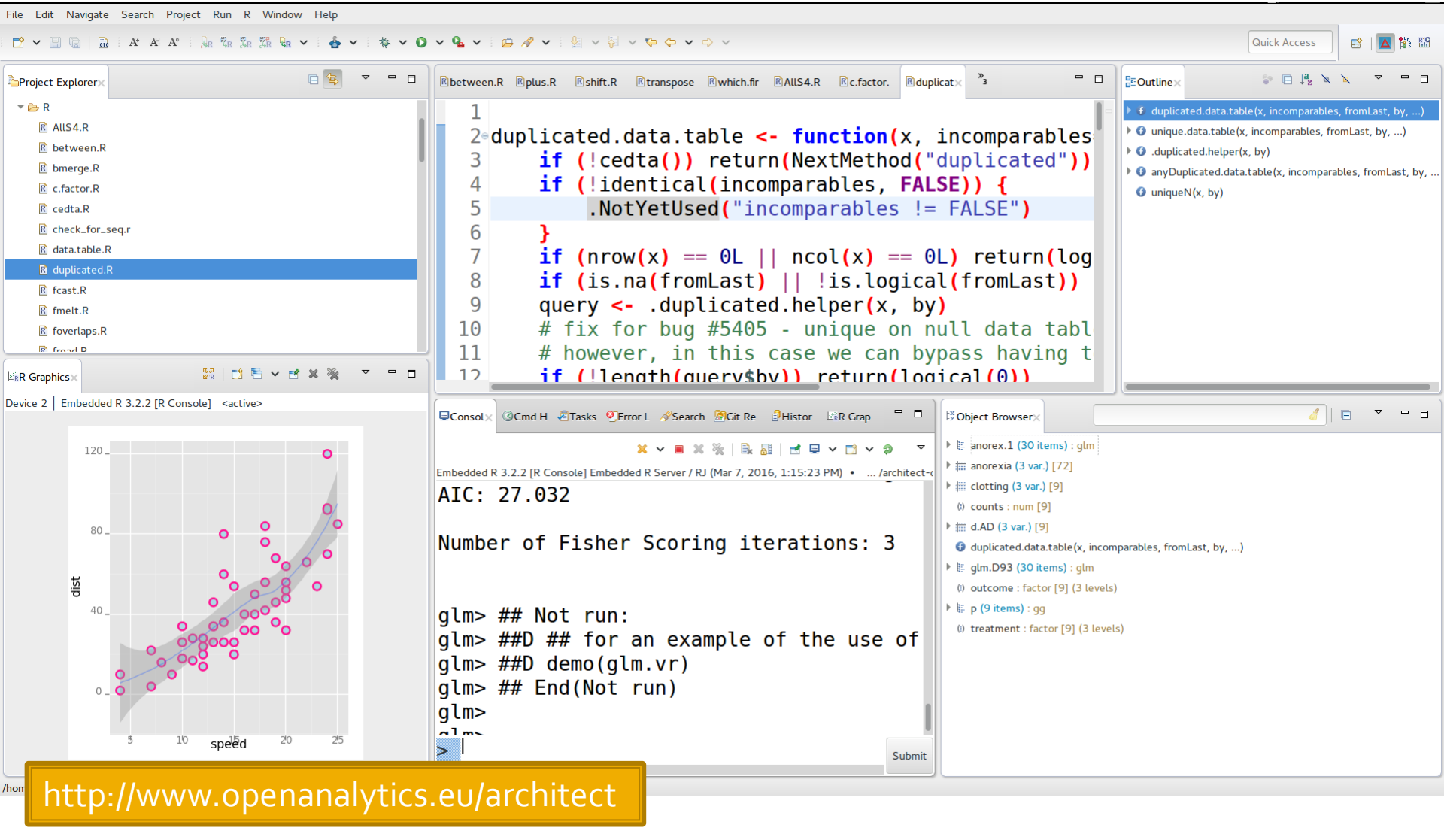


www.dawnsci.org

Integrated Computing Environment – Oakridge National Labs, US



Architect R IDE - Belgium

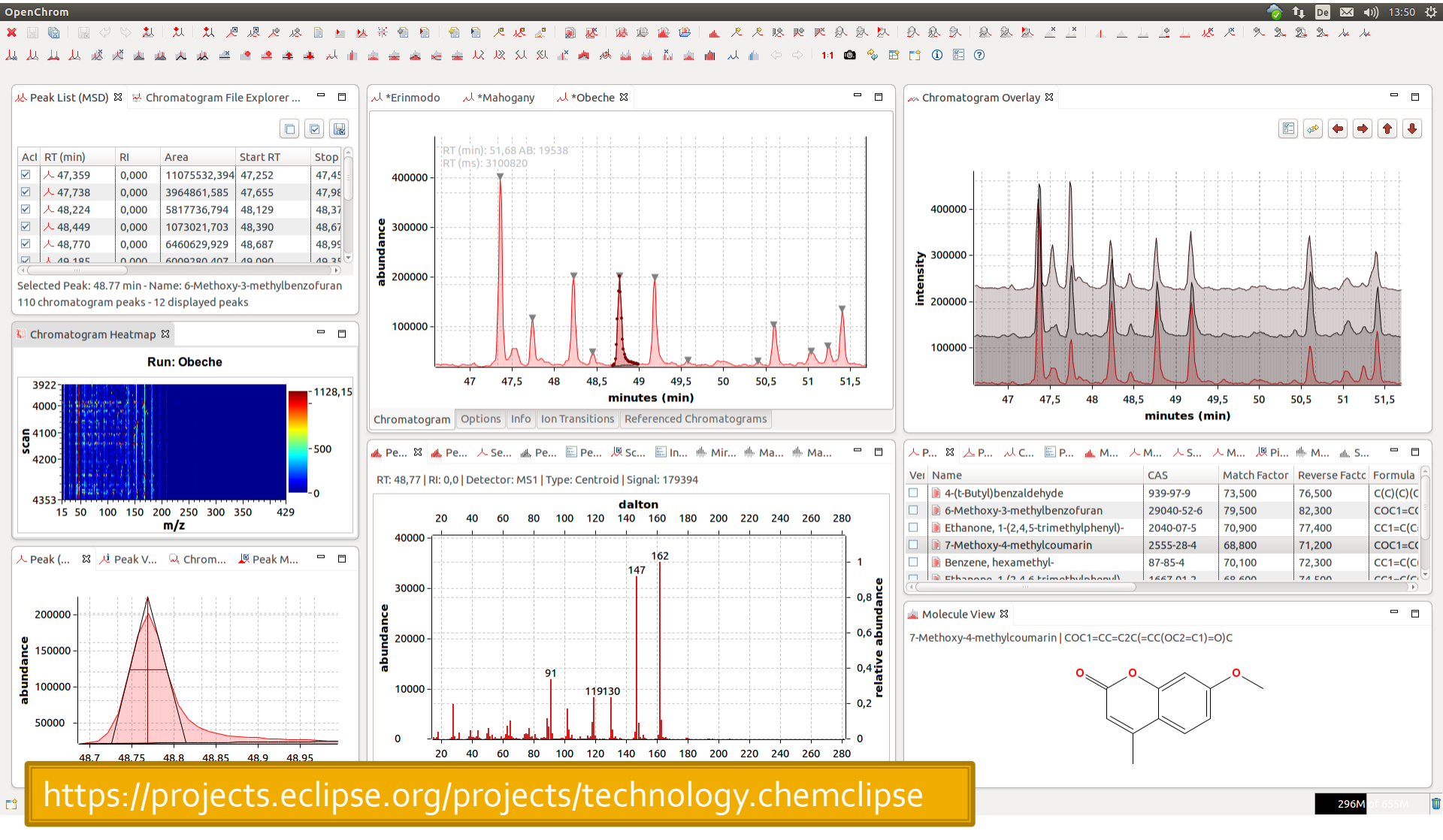


http://www.openanalytics.eu/architect

Apogy – Canadian Space Agency

https://bitbucket.org/apogy/ca.gc.asc_csa.apogy

ChemClipse



https://projects.eclipse.org/projects/technology.chemclipse

Reusable Modular Building Blocks

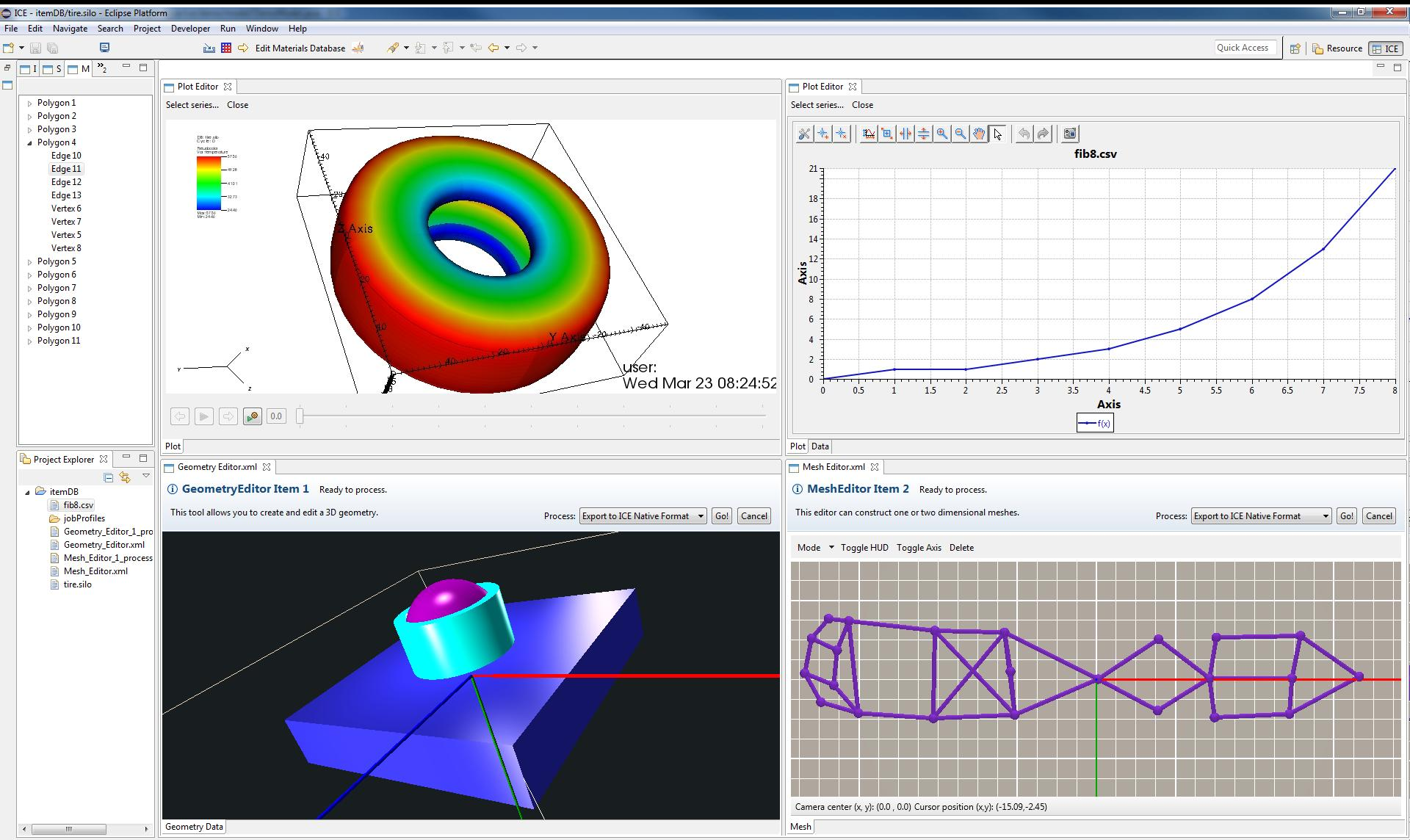
Data Structures

Python Scripting

Visualisations (2D, 3D)

Workflows

1. Eclipse Advanced Visualization Project (EAVP)



2. Data Structures

Project January (JAva NUmerical ARraYs)

- Numerical data structures, such as n-dimensional arrays ("numpy for Java")
- Common data structures for science, such as CSG Trees

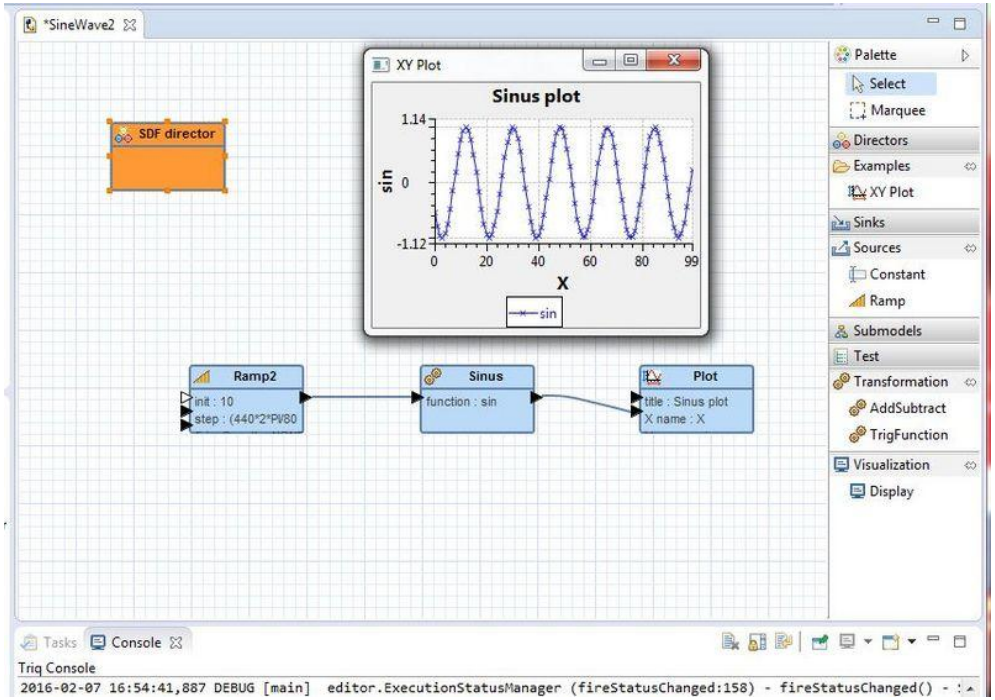
Standardized building blocks will be the key to integration between projects

3. Python Scripting

- Tight integration of Java and Python using Py4J
- Script Java from Python
  - Controlling the user interface from the console
- Extend Java with Python libraries
  - Ability to pass arrays and data from Java to Python

4. Workflows

- Triquetrum Project
- Focus on reproducible data processing



October Science Release 1.0

1. Eclipse ICE
2. ChemClipse

3. EAVP - Visualisations
4. January – Common Data Structures
5. Triquetrum – Workflows

https://science.eclipse.org/

October Science Release 1.0

"Open source is having tremendous impact on both productivity and innovation in industry, government, and academia.

The Eclipse Science Working Group is a great example of how world-leading scientific research organizations like Oak Ridge National Laboratory, Diamond Light Source, and others can collaborate on delivering free software that will enable the next major scientific breakthrough."

– Mike Milinkovich, Director Eclipse Foundation

Get Involved

Lurker	• Sign up to science-iwg mailing list or individual project mailing list
Contributor	• Provide feedback, report bug, provide patches, documentation, etc • Join in at events
Committer	• Develop new features, maintain projects, evangelize, etc
Strategic	• Institutional level, voting rights, PMC, Steering Committee, etc

Software To Advance Science

Reusable, Open- Source Software Tools and Services

The End – Questions?

Tracy Miranda tracy@kichwacoders.com

@tracymiranda