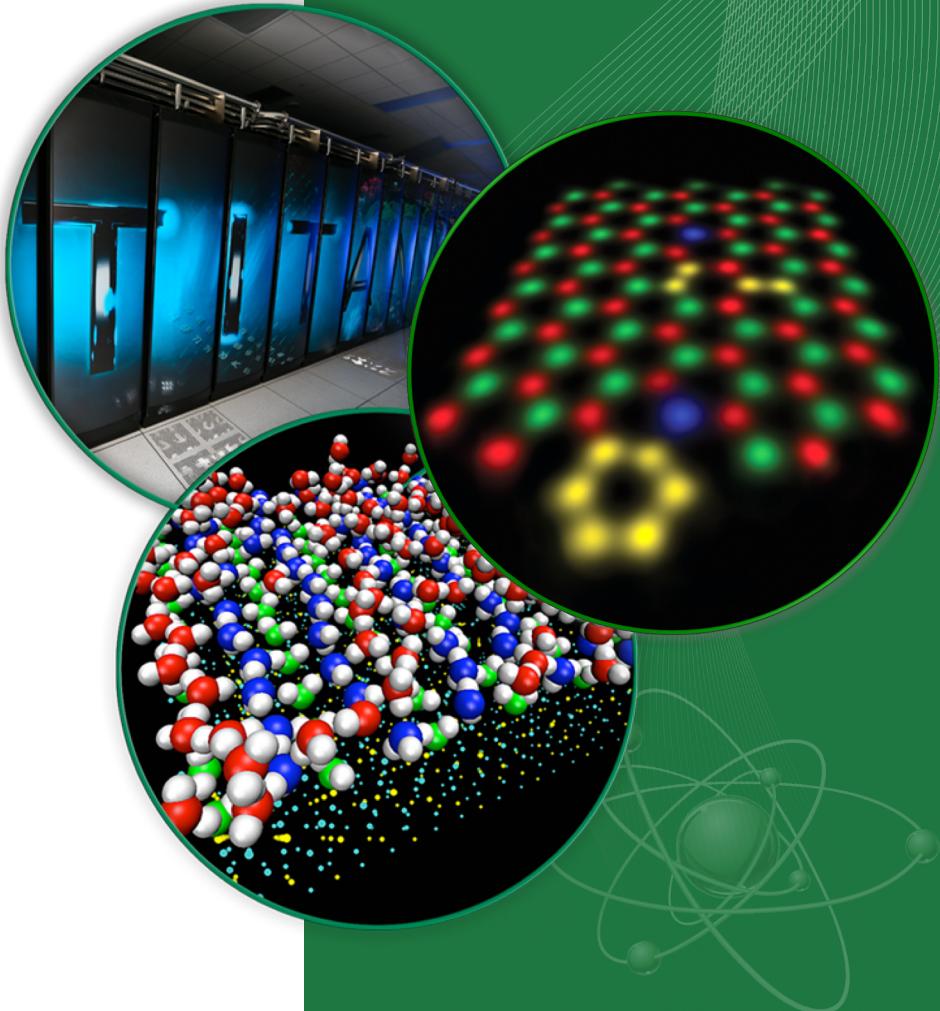


# Imaging and Spectral Data Analysis in Python

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CNMS User Meeting Workshop  
Oak Ridge National Laboratory  
August 13<sup>th</sup> 2018



# Welcome

Welcome!

CNMS User Meeting Workshop  
August 13 2018

# Some pointers

- We hope you get out of this workshop:
  - Understanding of python ecosystem
  - How to use notebooks
  - Basic data manipulation, analysis and plotting
  - Where to go for resources and help
  - How to utilize python for your own needs
- Prerequisites
  - Basic understanding of programming
  - Please make sure to download anaconda's distribution of python (see your welcome email).

# Agenda

| Time             | Mode     | Topic  |
|------------------|----------|--|
| 9:00 - 9:30 AM   | Hands-on | Installing software  |
| 9:30 - 9:45 AM   | Talk     | Welcome and overview of workshop   |
| 9:45 - 10:00 AM  | Hands-on | Introduction to Jupyter Notebooks  |
| 10:00 - 10:15 AM | Hands-on | Basics of Python   |
| 10:15 - 10:30 AM |          | Coffee Break   |
| 10:30 - 10:45 AM | Hands-on | Numerical operations using NumPy   |
| 10:45 - 11:00 AM | Hands-on | Visualization using Matplotlib   |
| 11:00 - 11:30 AM | Hands-on | Spectral processing  |
| 11:30 - 12:00 PM | Hands-on | Image processing   |
| 12:00 - 1:00 PM  |          | Lunch (on your own)  |
| 1:00 - 2:00 PM   | Demo     | Multivariate analysis and spectral unmixing                                      |
| 2:00 - 3:00 PM   | Talk     | Universal data, processing framework for imaging and spectroscopy                |
| 3:00 - 3:20 PM   |          | Coffee break   |
| 3:20 - 3:45 PM   | Talk     | Application: Denoising images and finding atoms                                  |
| 3:45 - 4:05 PM   | Talk     | Application: Visualizing invisible physical features using multivariate analysis |
| 4:05 - 4:25 PM   | Talk     | Application: Bringing Kelvin Probe Force Microscopy into the information age!    |
| 4:25 - 4:45 PM   | Talk     | Application: Ultrafast current-voltage spectroscopy using Bayesian inference     |
| 4:45 - 5:00 PM   | Talk     | Summary of workshop  |
| 5:00 PM onwards  |          | (Optional) Discussion  |

# Questions