[Water Management using Smart Radiation Sensors](…)
COSMIC-SWAMP Workshop Day 1
18th July 2022
Remote

Agenda

Day 1 : 18/07/22

– Introduction –
13:30 BST – Workshop Introduction, P. Stowell
13:40 BST – Factors affecting cosmic ray sensing, R. Rosolem

– Cosmic Ray Sensor Networks –
14:00 BST – COSMOS-UK and other Cosmic-Ray Neutron Sensor Applications, J. Evans
14:20 BST – COSMOS-Global, R. Rosolem
14:40 BST – Use of CRNS for scheduling drip irrigation, M. Köhli

15:00 BST – Short Break

– Radiation Sensors –
15:10 BST – A novel and compact CRNS sensor, L. Stevanato
15:30 BST – StyxNeutronica Neutron Sensors, M. Köhli
15:50 BST – BN:ZnS Neutron Sensors, P. Stowell

– Soil Sensing –
16:00 BST – Drought Monitoring in Brazil, M. Galdos
16:20 BST – Understanding drainage on railways, A. Nichols
16:40 BST – Nitrogen Application and Upland Rice, A. Heinemann

Joining Details
The workshop will be hosted on zoom. Connection details and room password are below.

Day 1 Zoom Meeting Opening: Jul 18, 2022 01:00 PM London
Day 1 Zoom Link : https://durhamuniversity.zoom.us/j/94366190085?pwd=Smh1T2tPOWZoL3RyUWJFclUrZDBGUT09

Day 1 Meeting ID: 943 6619 0085
Day 1 Passcode: 603529

If you have any difficulties connecting please email to john.p.stowell@durham.ac.uk and we will try to assist as soon as possible.

Water Management using Smart Radiation Sensors
COSMIC-SWAMP Workshop Day 2
19th July 2022
Remote

Agenda

Day 2 : 19/07/22

<u>– Software –</u>
10:00 BST – URANOS Tutorial, M. Köhli/P. Stowell
11:00 BST – CRSPY Tutorial, D. Power/P. Stowell
12:00 BST – Corny -- Comic-Ray Neutron processing toolbox, M. Schrön

12:30 BST – Break for Lunch

<u>– IoT Networks –</u>
14:00 BST – SWAMP Pilot Project Results, C. Kamienski
14:20 BST – DalesLandNet SigFox Soil Moisture Probes, N. Hall
14:40 BST – SWAMP Soil Moisture Probes, A. Netto

15:00 BST – Short Break

<u>– Neutron Sensing in Brazil –</u>
15:10 BST – RDT Ltd Sensors, D. Weaver
15:30 BST – COSMIC-SWAMP Progress, P. Stowell
16:00 BST – Discussion and Closing Remarks

Joining Details
The workshop will be hosted on zoom. Connection details and room password are below.

Day 2 Zoom Meeting Opening: Jul 19, 2022 08:00 AM London
Day 2 Zoom Link: https://durhamuniversity.zoom.us/j/93498071020?pwd=QTBoQnpKOVBidDBJVktSQllxQ1lqdz09

Day 2 Meeting ID: 934 9807 1020
Day 2 Passcode: 530963

If you have any difficulties connecting please email to john.p.stowell@durham.ac.uk and we will try to assist as soon as possible.

Software Tutorial

The software tutorial at the workshop on the second day will require a local installation of the URANOS and CRSPY code to follow all steps. We will demonstrate how to generate and process simple neutron data in with these codes

Those wishing to follow the tutorials please look to install the software before the workshop with plenty of time to spare. If you have any difficulties installing the code please email to john.p.stowell@durham.ac.uk and we will try to assist as soon as possible.

URANOS installation instructions

Those wanting to generate their own URANOS data files will need to manually install URANOS using the windows binaries provided. The steps are as follows:

1. Download the zipped binary package and the ENDF data zip file using the links below.
2. Unzip the URANOS files into a folder of your choice.
3. Unzip the ENDF data files into a folder of your choice.
4. Run URANOSGUI.exe.
5. Insert the full path and filename of the IncomingSpectrum.root file from ENDF into Input Spectrum Calibration File under URANOS' Setup tab on the configuration page.
7. Insert the full path to the ENDF files into Cross Section Folder under URANOS' Setup tab.
8. Set a work directory where the configuration of your scenario is to be stored. Mind a trailing slash.
9. Set an output directory where the simulation results will be stored. Mind a trailing slash.

URANOS : https://github.com/mkoehli/uranos
URANOS Windows Binaries : https://github.com/mkoehli/uranos/blob/main/binaries/URANOS.zip
URANOS ENDF Data Files : https://github.com/mkoehli/uranos/blob/main/data/ENDFdata.zip

Data analysis will be undertaken with python and matplotlib. If you are unable to install URANOS, example simulation data files will still be provided for anyone wanting to learn how how to process the typical outputs from URANOS.

CRSPY and data analysis Docker installation instructions

To remove dependency issues, a docker image has been setup for both of these codes using Jupiter notebook which can be easily run on the day. Docker provides a way to containerise each of the required environments in a way that it can be easily deployed on multiple operating systems. To prepare for using these images please install docker and check it works using:

1. Install docker : https://docs.docker.com/get-docker/
2. Run : `docker run hello-world`

CRSPY Manual Installation

For those wanting a local python instance of CRSPY it can also be installed manually using the following command:
1. `pip install crspy`

Notes on how to setup a CRSPY data structure are then below.
CRSPY : https://github.com/danpower101/crspy
CRSPY Getting Started : https://github.com/danpower101/crspy/wiki/Getting-Started

CORNY Manual Installation

The CORNY software tool aims to make it easier to process CRNS station and rover data using a nice GUI built in python. There will be presentation at the software tutorial on how CORNY works. Those wanting to play around with the code before hand can download it from the following link.

https://git.ufz.de/CRNS/cornish_pasdy

Tutorial Git Repo

Required files for the software tutorial have been placed here:
https://gitlab.com/patrickstowell/cosmic-swamp-workshop-2022/-/tree/main

Grab the complete tutorial zip file from here:
https://gitlab.com/patrickstowell/cosmic-swamp-workshop-2022/-/archive/main/cosmic-swamp-workshop-2022-main.zip

The quickest way to run the code in the tutorials is through docker. This avoids any build issues that will be difficult for us to debug on the day.

Several examples are included for Windows and Linux:
- Run URANOS simulation through docker with GUI/noGUI
- Run URANOS analysis through Jupyter notebook (docker option available)
- Run CRSPY analysis through Jupyter notebook (docker option available)

If you are familiar with docker, you can play around with the following docker images.

- docker run -it --rm -p 8888:8888 johnpatrickstowell/uranos_tutorial

- docker run -it --rm -v $PWD:/uranos/workdir/ -w /uranos/workdir/ johnpatrickstowell/uranos-ubuntu bash /runuranos noGUI Uranos.cfg -platform offscreen

- docker run -it -p 8888:8888 johnpatrickstowell/crspy_tutorial