



eLearning im Kontext der Fernerkundung

- Ressourcen, Technologien und Bezugsquellen -

About me

- Master of Sciences in Geoinformatics from Uni Jena, Germany
- Coordinator of the EO College learning portal
- Specialised in the conception, development and production of eLearning content
- CEO of ignite eduaction



Robert Eckardt
University of Jena |
ignite eduaction



Outline

I. EO College

II. Other Resources

III. Modern eLearning Tools



Where to learn EO?



EO College



September 2017



>17.000 registered users

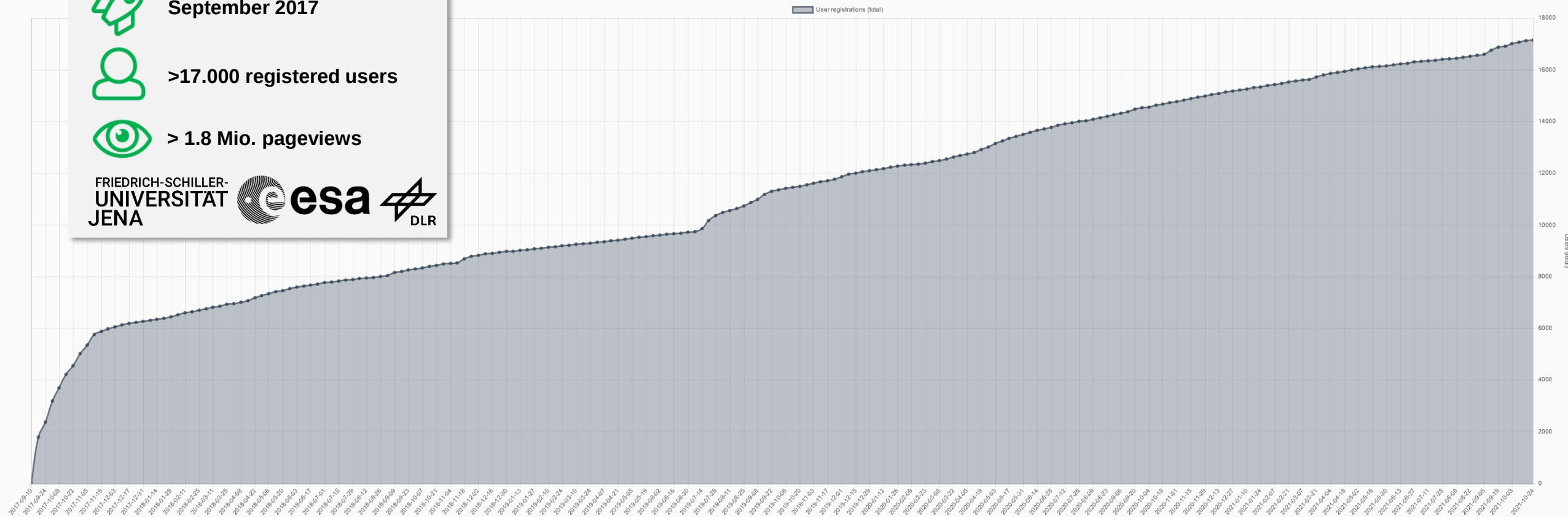


> 1.8 Mio. pageviews

FRIEDRICH-SCHILLER-
UNIVERSITÄT
JENA



eo-college.org





eo college

COURSES

EVENTS

RESOURCES

DISCUSSION

SOFTWARE ▾

ABOUT ▾

EO COLLEGE ▾

eo

Q

🔔

Q Enter search term

Order By ▾

CATEGORY

Select some options ▾

SPECTRUM

Radar × ▾

TYPES

Select some options ▾

LANGUAGE

Remove filters

UNIT

Biomass

SAR EDU • March 10, 2021

UNIT

The evolution of Sentinel-1

EO College • July 25, 2019

UNIT

Land Cover Classification

EO College • July 25, 2019

TALK

Conceptos básicos de SAR

NASA ARSET • April 24, 2019

TALK

SAR Processing and Data Analysis

NASA ARSET • April 24, 2019

TALK

Procesamiento y análisis de datos de SAR

NASA ARSET • April 24, 2019

TALK

Introduction to Polarimetric SAR

NASA ARSET • April 24, 2019

TALK

Introducción SAR polarimétrico

NASA ARSET • April 24, 2019

TALK

Introduction to SAR Interferometry

NASA ARSET • April 24, 2019

TALK

Introducción a SAR interferométrico

NASA ARSET • April 24, 2019

TALK

Basics of SAR

NASA ARSET • April 24, 2019

BOOK

SAR Handbook

SERVIR Global • April 11, 2019



ECHOES IN SPACE

Introduction to Radar Remote Sensing

FREE OF CHARGE

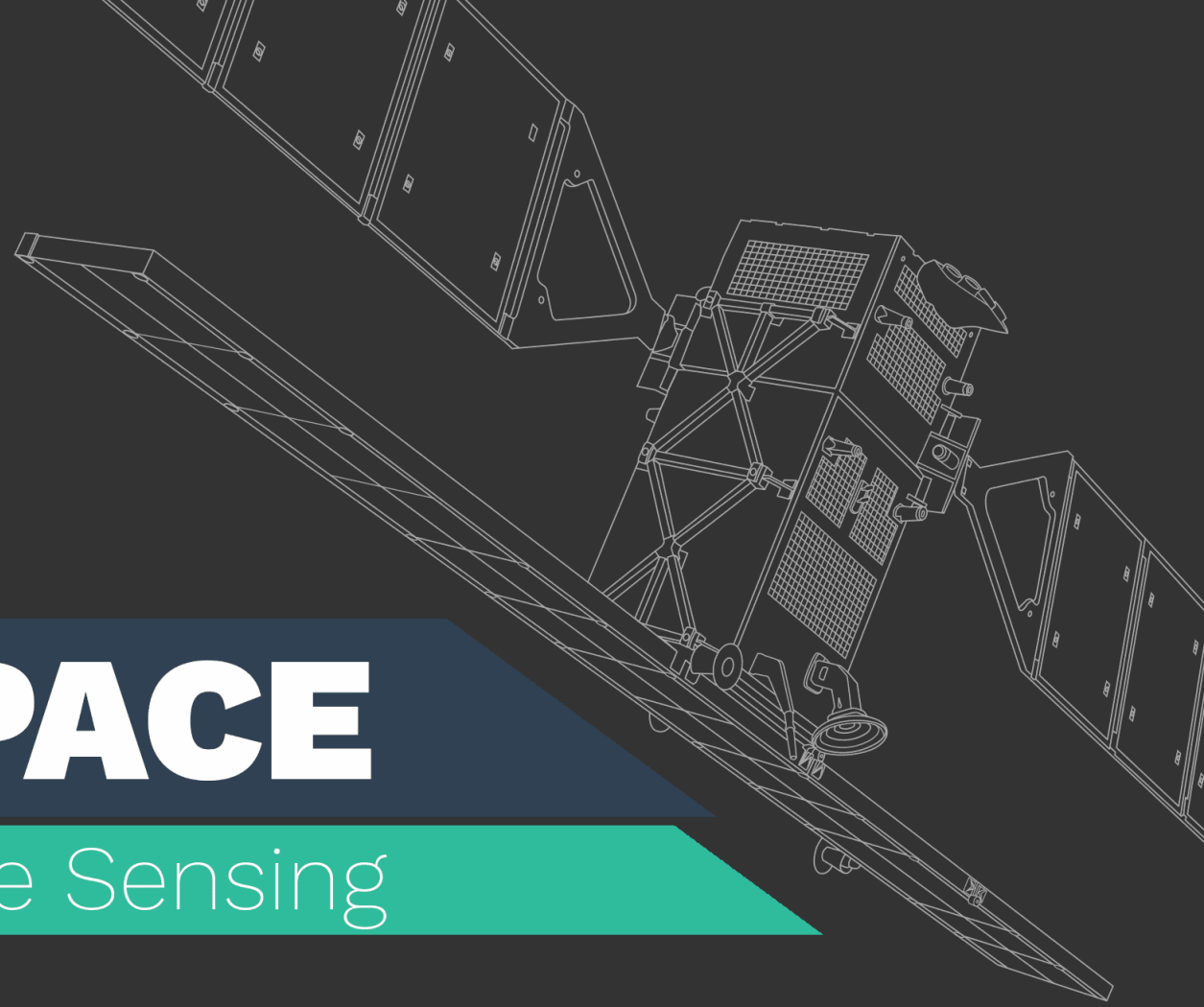
OPEN TO ANYBODY

SELF-PACED LEARNING

> 5.000 Students

5 LESSONS

CERTIFICATE FOR COMPLETION





Introduction

What is radar?

Radar History

What is an active radar system?

Basics of active systems

The SAR principle

What is an electromagnetic wave?

Properties of EM Waves

The EM spectrum

Sensors & Missions

The radar bands

Existing missions

Getting used to radar images

SAR image features

Comparison to optical images



The imaging
geometry

Radar imaging geometry

Effects of imaging geometry

Interaction with
the Earth
surface

The scattering
mechanisms

Important parameters

How to
obtain and
use radar
data

Sentinel-1 data access

Intro to SNAP

Other data sources



Theory

Intro to Interferometry

Intro to Polarimetry

Intro to Time Series

Settlements

Urban applications

Urban Tutorial

Forest

Forest applications

Forest tutorial

Agriculture

Agriculture
Applications

Agriculture tutorial



Theory

Scattering mechanisms
over water

Water Bodies

Water body applications

Water body tutorial

Oceanography

Maritime Applications

Sea Ice

Sea Wind

Sea Waves

Sea Surface
Current

Oil Spill Mapping



Theory

Subsidence Monitoring

Hazard monitoring

Seismic events

Seismic introduction

Volcano Tutorial

Flood monitoring

Flood applications

Flood tutorial

Wrap up

Processing tools

Final test

Land in Focus

Basics of Remote Sensing



Fundamentals of Remote Sensing

Electromagnetic Waves and their Spectrum

Atmospheric Interaction

Reflection and Absorption



Passive Imaging Techniques

Active Imaging Techniques



Spatial Resolution

Temporal Resolution

Spectral Resolution

Radiometric Resolution



Preprocessing – Optical Data

Preprocessing – Radar Data

Sensor Accuracy



Visual Image Interpretation

Objects and Pixels

Classification

Accuracy Assessment

Image Classification Tutorial

Time Series Analysis



Software

Platforms for Data Access

Cloud Processing



Further Courses



GRUNDLAGEN der Radarrückstreuung



BASIC PRINCIPLES of Radar Backscatter



PRINCIPES FONDAMENTAUX de la rétrodiffusion radar

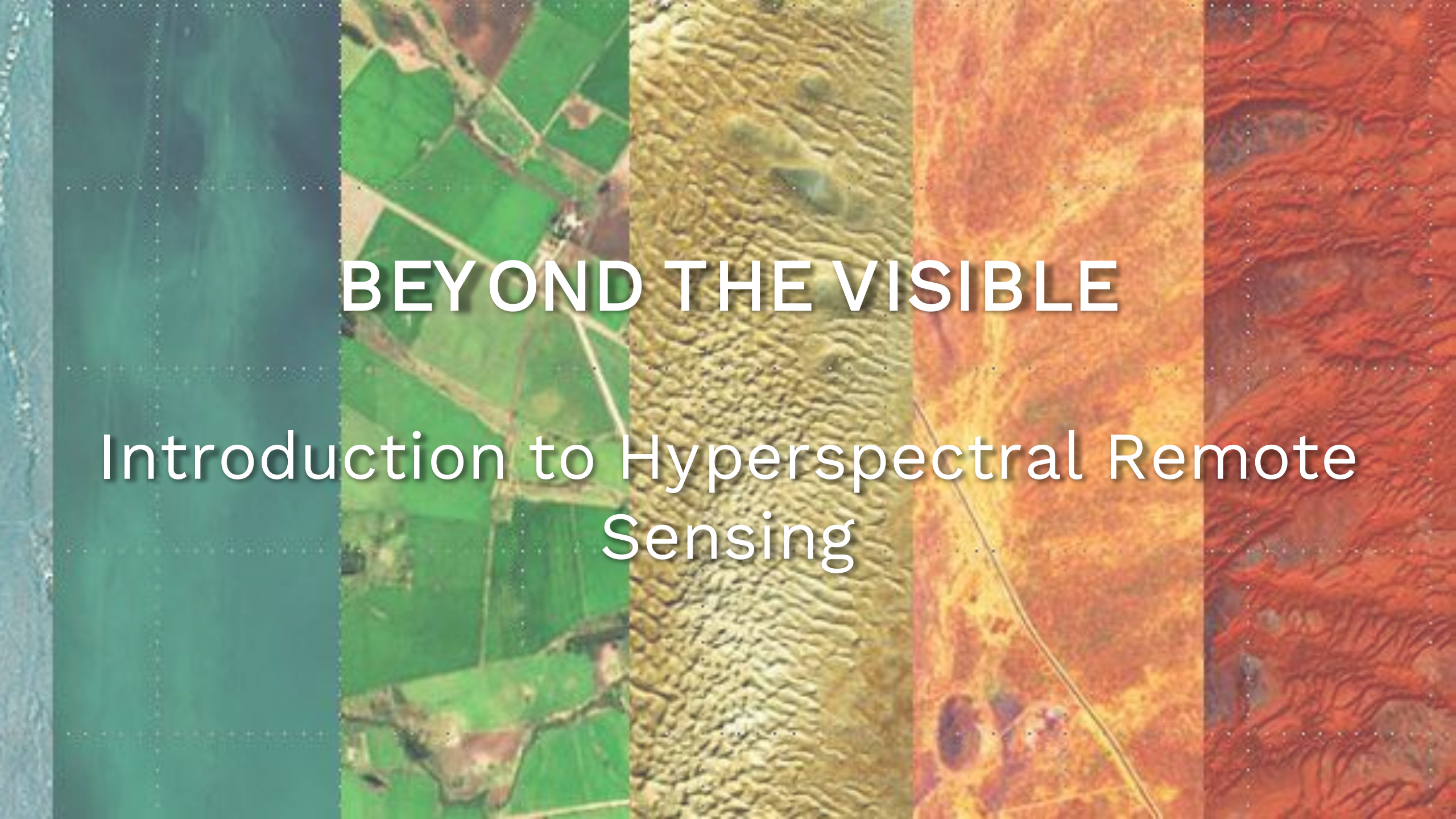


PRINCIPIOS BÁSICOS de la Retrodispersión Radar





Future Courses



BEYOND THE VISIBLE

Introduction to Hyperspectral Remote Sensing

Winter, Water, Warming

Radar applications in Canada



A top-down view of a group of people's hands, mostly of African descent, cupped together in a circle. The hands are holding a large pile of golden-brown wheat grains. The background is dark, and the lighting highlights the texture of the skin and the grains. Some hands have colorful beaded bracelets.

ZERO HUNGER

The role of remote sensing
in the path towards SDG #2



Other Resources



Training Calendar

- Most comprehensive collection of EO-related trainings worldwide
- Multiple implementations (e.g. CEOS WGCapD, EUMETSAT) form different organisations
- Mutual database for collection of resources

Go to
Training Calendar

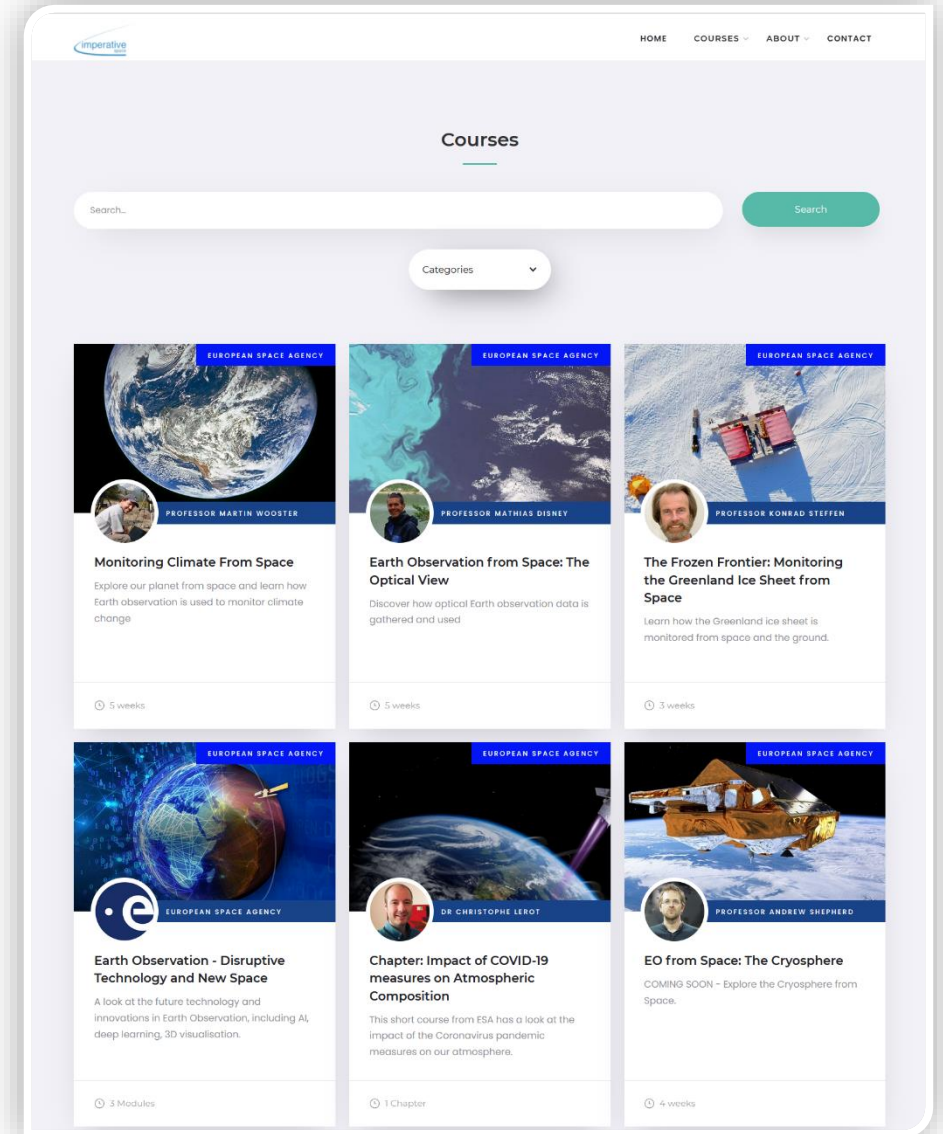
The screenshot shows the 'Events' page of the EO College website. The page has a dark blue header with the 'eo college' logo and navigation links: COURSES, EVENTS, RESOURCES, DISCUSSION, SOFTWARE, and ABOUT. On the right side of the header, there are links for 'EO COLLEGE', the 'eo' logo, a search icon, and a notification bell icon. Below the header, the word 'Events' is displayed in a large, light blue font. The main content area features a sidebar on the left with a search bar and several filter categories: REGIONS, LANGUAGE (with 'English' selected), TRAINING TYPE, and THEMATIC AREAS. A 'Remove filters' button is located at the bottom of the sidebar. The main content area displays a grid of 12 event cards. Each card includes the event title, date range, language, type, and host. The events listed include 'South-Eastern Europe Meteorological Training Course (SEEMET)', 'Application of machine learning approaches to ocean colour topics', 'Training school and Workshop on Dust Aerosol Detection and Monitoring', 'Weather-related satellite data with Jupyter Notebooks', 'Winter Weather in Satellite Data', 'Coding for EO (Python & R)', 'Machine Learning for Seamless Thunderstorm Nowcasting', 'Gap Filling Ocean Data', 'RMetS Autumn Series of Meteorological Masterclasses: Sea Ice in the Climate System', and 'RMetS Autumn Series of Meteorological Masterclasses: Sea Ice in the Climate System'.



Imperative MOOCs

- UK-based developer of EO-related online courses

Go to
Imperative MOOCs



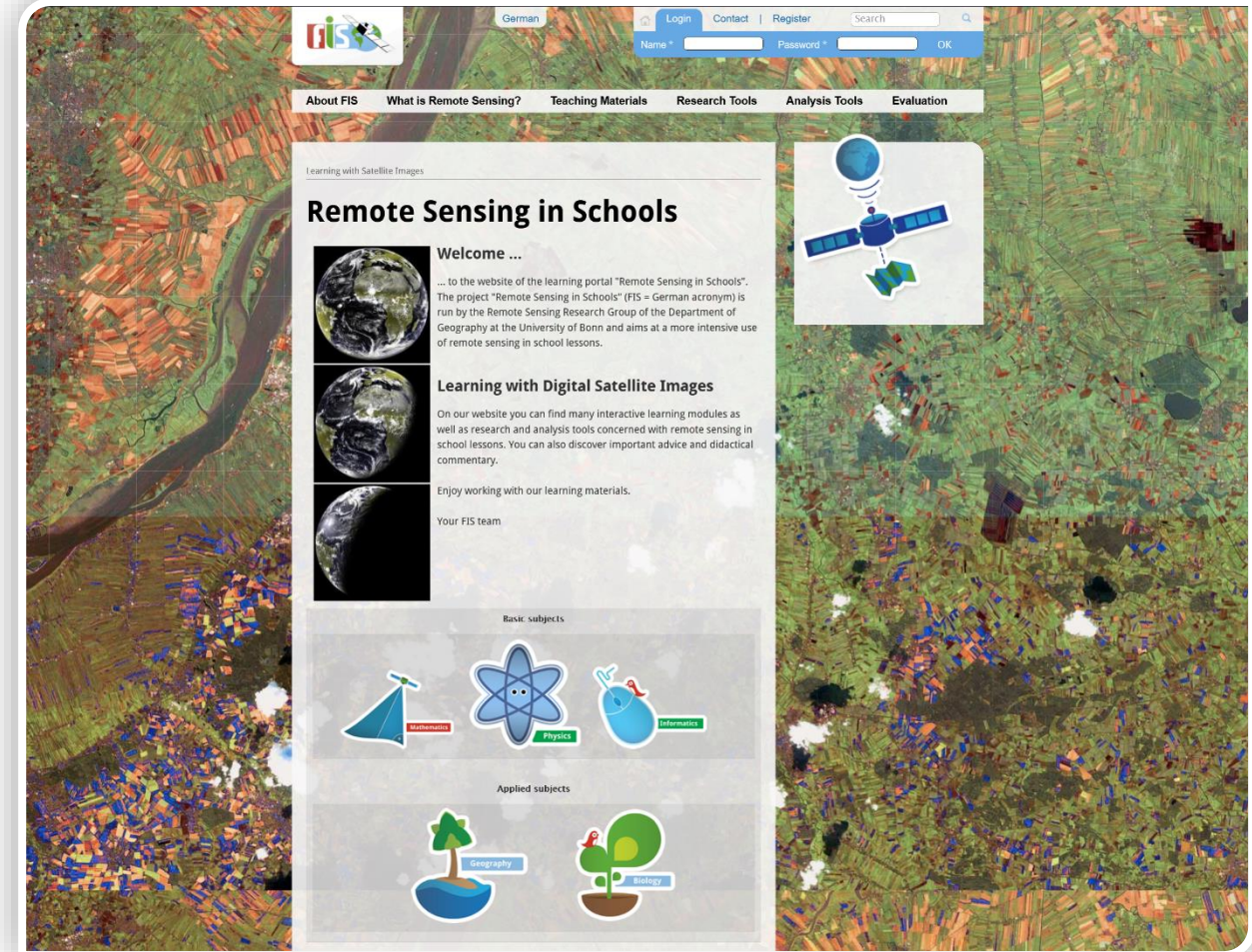
<https://www.imperativemoocs.com/>



Remote Sensing in Schools

- Free learning materials, specifically designed for schools
- Also very useful for beginners in the subject

Go to
RS in Schools

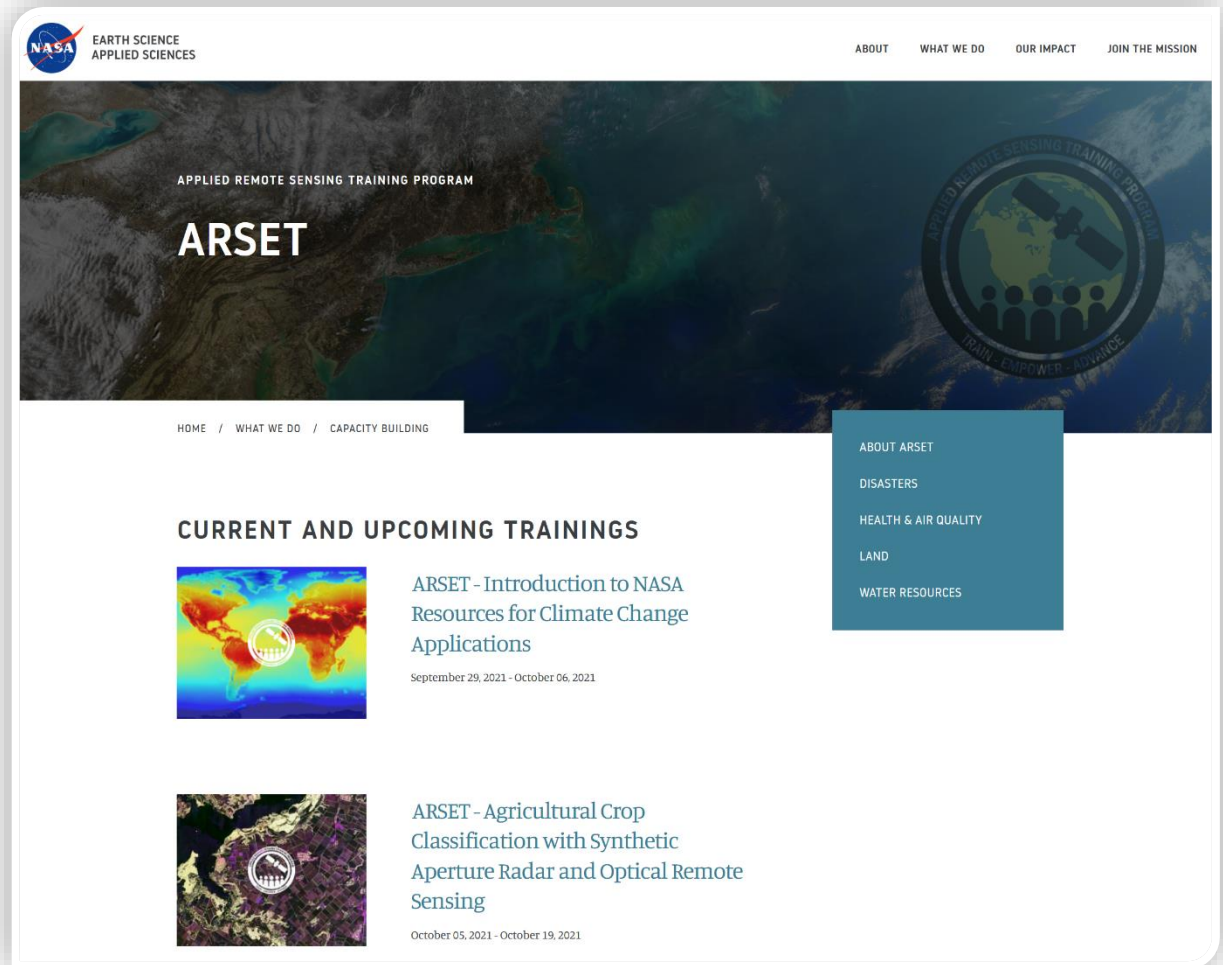




NASA – Applied Remote Sensing Training Program

- Extensive set of webinars

Go to
NASA Arset



<https://appliedsciences.nasa.gov/>



ESA - eo4society

- Collection of ESA training offers
 - MOOCs
 - Webinars
 - Video tutorials
 - On-site trainings

Go to
ESA eo4society

MASSIVE OPEN ONLINE COURSES (MOOCs)

ESA's Massive Open Online Courses (MOOCs) show how EO technology and data applications work, what the data looks like and how it can have impact in both science and on the ground through real-world case studies.

They are designed to welcome students from all paths of life: from scientists to policy-makers, teachers, or other professional, as well as school or university students or casual learners.

Each course lasts several weeks, and breaks the mould of conventional education by blending data, video, apps and on-line materials. The learning experience can be personalised thanks to its social aspect (with online discussions and feedback from educators) and to the use of optional materials.

A NEW ONE: Impact of COVID-19 measures on Atmospheric Composition How did COVID-19 affect the atmosphere? Learn about the ICovac project and its findings. MORE INFO	A NEW ONE... Land in Focus: Basics of Remote Sensing A series of online learning materials suitable for anybody interested in the potential of remote sensing technologies for applications over land surfaces. MORE INFO	AN ONGOING MOOC: Echoes in Space Echoes in Space is suitable for anybody interested in getting an introduction to Radar images or looking to dive into the topic. MORE INFO	COMING SOON... EO from Space: The Cryosphere Learn about the role of satellite 'Earth observation' (EO) technology in monitoring the Earth's Cryosphere and the data it produces. MORE INFO
Earth Observation from Space: the Optical View An introduction to optical Earth observation: monitoring our planet from satellites, using photography, imaging in various wavelengths, lidar and other technologies. MORE INFO	Earth Observation: Disruptive Technology and New Space A series of interviews with leading experts across Earth Observation and related technologies. MORE INFO	Monitoring Climate from Space How does EO work, and how can it achieve the essential detail and comprehensive worldwide view that we need for climate monitoring. MORE INFO	The Frozen Frontier: Monitoring the Greenland Ice Sheet from Space You'll look at the measurements made possible by Earth Observation (EO) satellites like Cryosat, the technologies and MORE INFO

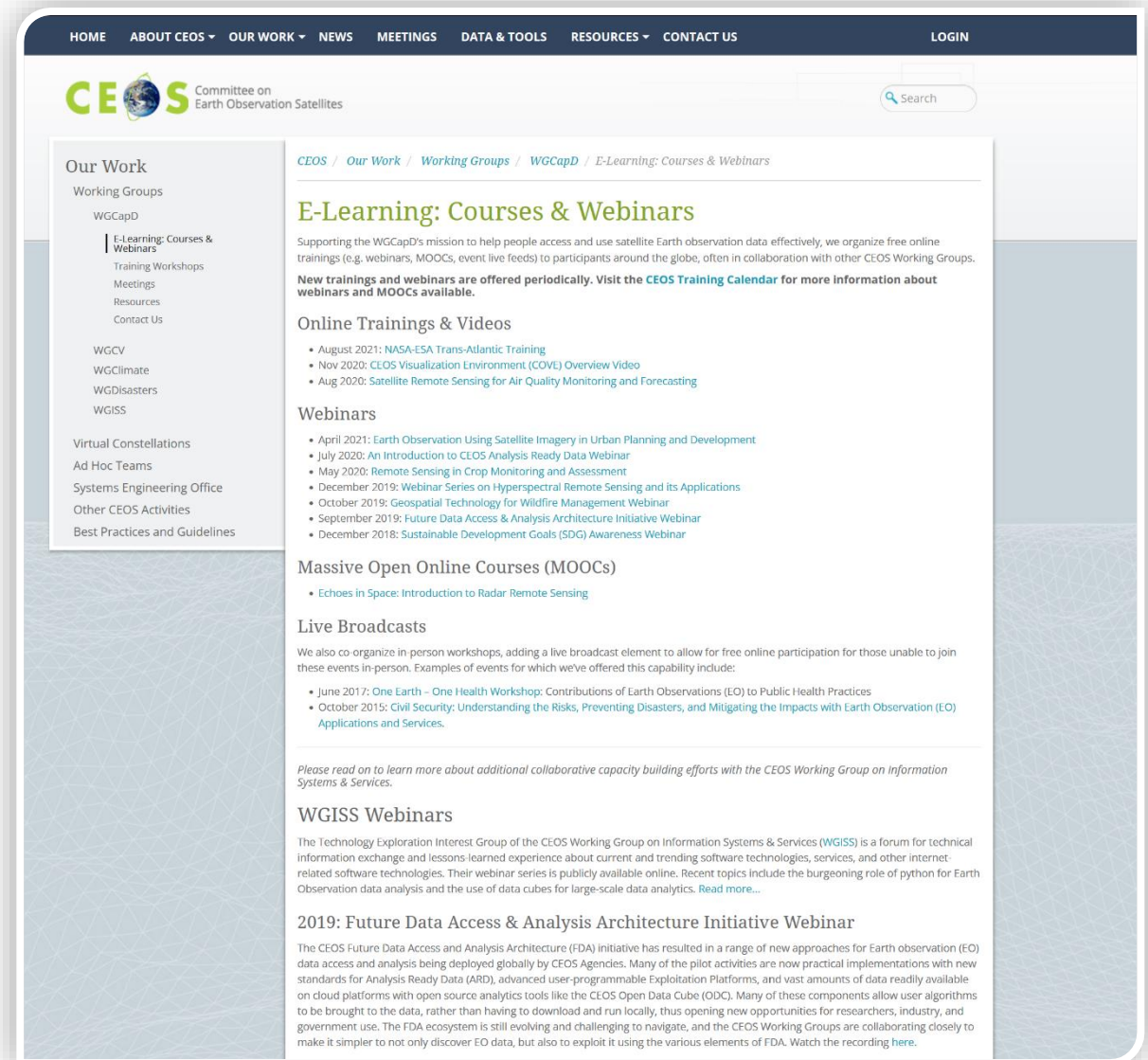
<https://eo4society.esa.int/training-education/>



NASA – Applied Remote Sensing Training Program

- Working group for international collaboration
- Network of int. Space agencies and associated members
- Overall very relevant contact point

Go to
CEOS WGCapD



<https://ceos.org/ourwork/workinggroups/wgcapd/>



UN SPIDER Knowledge Portal

- Collection of best practise guides for e.g. disasters
- Vast collection of resources, data sources etc.

Go to
UN SPIDER

The screenshot shows the UN SPIDER Knowledge Portal website. At the top, there is the United Nations logo and the text "United Nations Office for Outer Space Affairs UN-SPIDER Knowledge Portal". A search bar is located on the right. Below the header is a navigation menu with links: Home, About Us, Space Application, Links & Resources, Risks & Disasters, Advisory Support, Network, Projects, News & Events, and Admin. The main content area features a Google Earth Engine interface displaying a map of Niger with flood data. A sidebar on the left shows a "Flood status between: 2020-09-10 and 2020-09-25" with statistics: "Estimated flood extent: 2379 hectares" and "Estimated number of exposed people: 1270". Below the map, there is a news article titled "UN-SPIDER and DNPC of Niger Organise a Virtual Training Course". Further down, there is a section titled "Explore the Knowledge Portal" with four cards: "How can space technology be applied in disaster and risk management?", "Where can I access satellite data, products and other resources?", "Who are the users of space technology in disaster and risk management?", and "Which services can UN-SPIDER offer to Member States?". Below this is a "Stay Up to Date" section with "News" and "Upcoming Events". The "News" section includes two items: "Thu Sep 2 2021 WMO releases Atlas of impacts of weather, climate and water extremes 1970-2019" and "Tue Aug 24 2021 UN-SPIDER Bonn International Conference, 16 to 18 November 2021". The "Upcoming Events" section includes two items: "11/10/2021 to 14/10/2021 Fifth Arab Regional Platform for Disaster Risk Reduction" and "11/10/2021 to 15/10/2021 ESA Earth Observation Phi-Week 2021".

<https://www.un-spider.org/>



Modern eLearning Tools



H5P



EXPLORABLE EXPLANATIONS





- [Jupyter Notebooks](#)
- [P5 JS](#)
- [Reveal JS](#)
- [Impress JS](#)

Weiterführende Angebote

- Konzeption und Entwicklung von individuellen Lernangeboten
- Spezifische Fernerkundungskurse (vor Ort oder virtuell)
- Seminare und Schulungen in Themen der Medienkompetenz und der Erstellung von Lernmaterialien



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ignite education