El Almendro Seminar 2020

Coordinator: Prof. Javier Rodríguez, Department of Thermal and Fluids Engineering UC3M
Session: December 18th, 2020 | 11 am-4:30 pm (Spain Peninsular Time)
Credits: 1 cross-curricular credit (*formación transversal*)
Free online seminar

Description

El Almendro is an annual seminar featuring a variety of presentations by Spanish researchers developing their work abroad or at prestigious institutions in Spain. They tell us about their research and professional experiences, and debate on different career-oriented topics with the participants. The presentations are addressed to a target audience from diverse areas in the field of **engineering and basic science**.

The seminar is streamed and can be followed:

- Live on the Blackboard Collaborate link below: https://eu.bbcollab.com/guest/c3ebfcfcb6d745099d3981a5e5dd09ae
- Recorded. The recording links will be provided shortly after the seminar.

Credits

Our Ph.D. students can earn one cross-curricular credit (*formación transversal*) for this activity. For this purpose, it is required to deliver a brief summary of at least one of the talks (maximum length: one page per presentation), in English or Spanish, and submit it to the coordinator by e-mail at javierrodriguezfluidmechanics@gmail.com within a month from the seminar, that is, before **January 18th, 2021.** The credit will be awarded to all students with a passing grade.

2020 Schedule is listed on next page. Videos from previous editions are available on our website:

El Almendro 2019	Part I | Part II | Part III
El Almendro 2018	Part I | Part II
El Almendro 2017	Part I | Part II
El Almendro 2016	Part I | Part II
El Almendro 2015	Part I | Part II

Inquiries: gestiondoctorado@uc3m.es

El Almendro Seminar 2020 | Schedule

11:00 am: Welcome words from the organizers

11:15 am: Carlos Wert. *Max Planck Center for Brain Research*

Reinforcement Learning in the Brain: Valence-Based Spatial Navigation in the Hippocampus

A computational model based on the opponency between serotonin and dopamine explains behavioural traits of hippocampal navigation. This topic serves as an example of how computational neuroscience intersects with machine learning.

11:50 am: Carlos San Miguel. *OpenBank*

From turbulence to finance. How I ended up using my PhD in fluid mechanics to solve financial risk problems

When I was finishing my PhD thesis on turbulent boundary layers, I never thought I would end up working in banking, but in the end all those skills I learned during my PhD thesis help me in my daily work. In this talk, I will explain how those experiences that one lives during the time of a PhD can be used in the industry and how a PhD can open more doors than expected.

12:30 pm: Break

13:00: Valeria Garbin. *University of Delft*

Bubbly! From cracking joints, to volcanoes, to the lab

Bubbles are hidden inside a variety of man-made or natural materials and fluids. Lots of tiny bubbles give texture to chocolate mousse. A few tiny bubbles created when we crack our joints are the cause for the "crack" noise we hear. Huge bubbles are formed inside volcanoes because of the decompression of magma as it rises to the surface of the Earth. From sub-millimeter to kilometer scales, from industrial to biological processes, researchers strive to understand and control the presence and evolution of bubbles. In this talk I will share with you my interest in understanding and controlling the behavior of bubbles inside different materials, and describe some experiments from my lab.

14:00: Debate: Prospects for professional future: Academia vs. Industry with Arjan van der Bos, *Canon Production Printing Netherlands B.V.*

15:00: Break

15:30: Roberto Zenit. *Brown University*

Some fluid mechanical aspects of artistic painting

Painting is a fluid mechanical process. The action of covering a solid surface with a layer of a viscous fluid is one of the most common human activities; virtually all manmade surfaces are painted to provide protection against the environment or simply for decoration. This process, in an industrial context, has been vastly studied and it is well understood. In the case of artistic painting the purpose is different. Painters learn how to manipulate the nonuniform deposition of paint onto a surface, through lengthy empirical testing of the action and modifying the physical properties of the fluids, to create textures and patterns of aesthetic value. In this paper, an analysis of some notable painting techniques is presented from the point of view of fluid mechanics. In particular, we discuss the so-called "accidental painting" technique, originally devised by David A. Siqueiros, which is the result of a Rayleigh-Taylor instability. An analysis of several techniques used by Jackson Pollock is also presented, showing how he learned to carefully control the motion of viscous filaments to create his famous abstract compositions. We also briefly discuss how pattern and textures are produced in decalcomania and watercolor painting. These investigations indicate that it is possible to establish concrete scientific discussions among modern fluid mechanics, art, art history, and conservation.

After the talk, Roberto will answer questions from students on their professional development.

16:30: Conclusions