Welcome To BiO-ENG430

2025-2026

Dr. Anne-Laure Mahul-Mellier

Instructor:

Dr Anne-Laure Mahul-Mellier
Laboratory of chemical biology of neurodegeneration
IBI Institute, Life sciences Faculty

anne-laure.mahul@epfl.ch

Teaching Assistants:

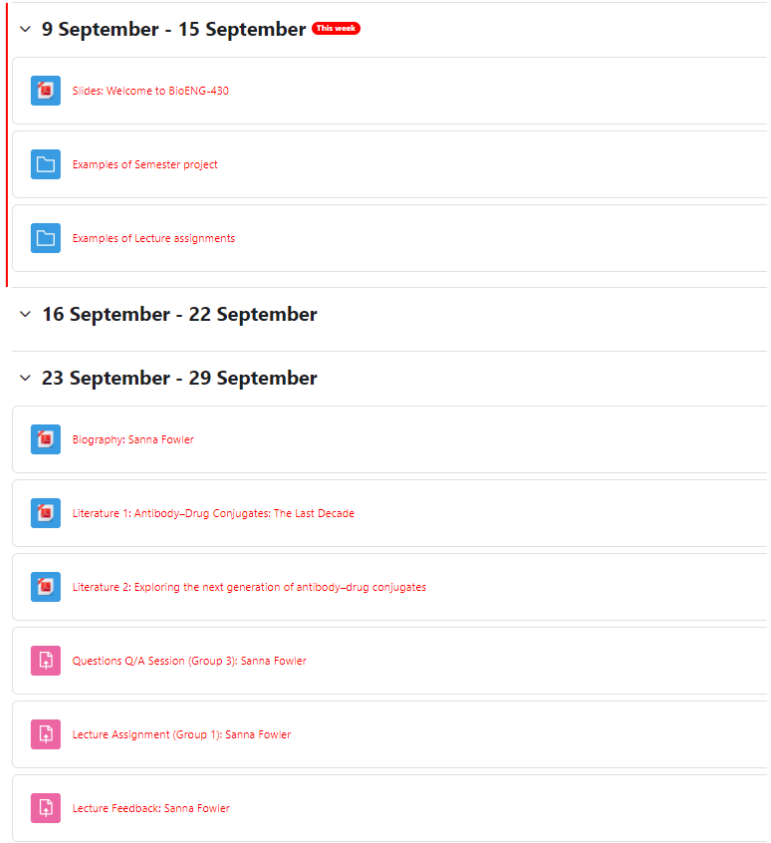
Manel Boussouf, PhD student
manel.boussouf@epfl.ch

Moodle Link:

https://go.epfl.ch/BIOENG-430

Moodle BioENG-430 - Organization

https://go.epfl.ch/BIOENG-430



BIOENG-430 at glance

- Instructor and TAs
- 2-Minute introduction
- Overview of course contents
- Assignement and grading
- Guest speakers
- How to provide feedbacks ?
- Group assignement organisation

BIOENG-430

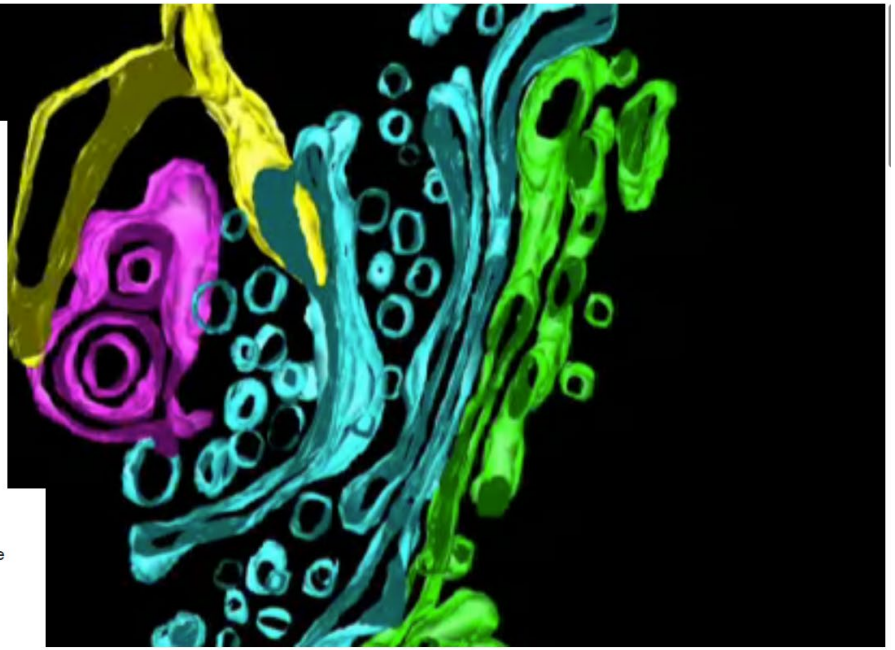
at glance

Instructor and TAs

Instructor and TAs

Who are we ?

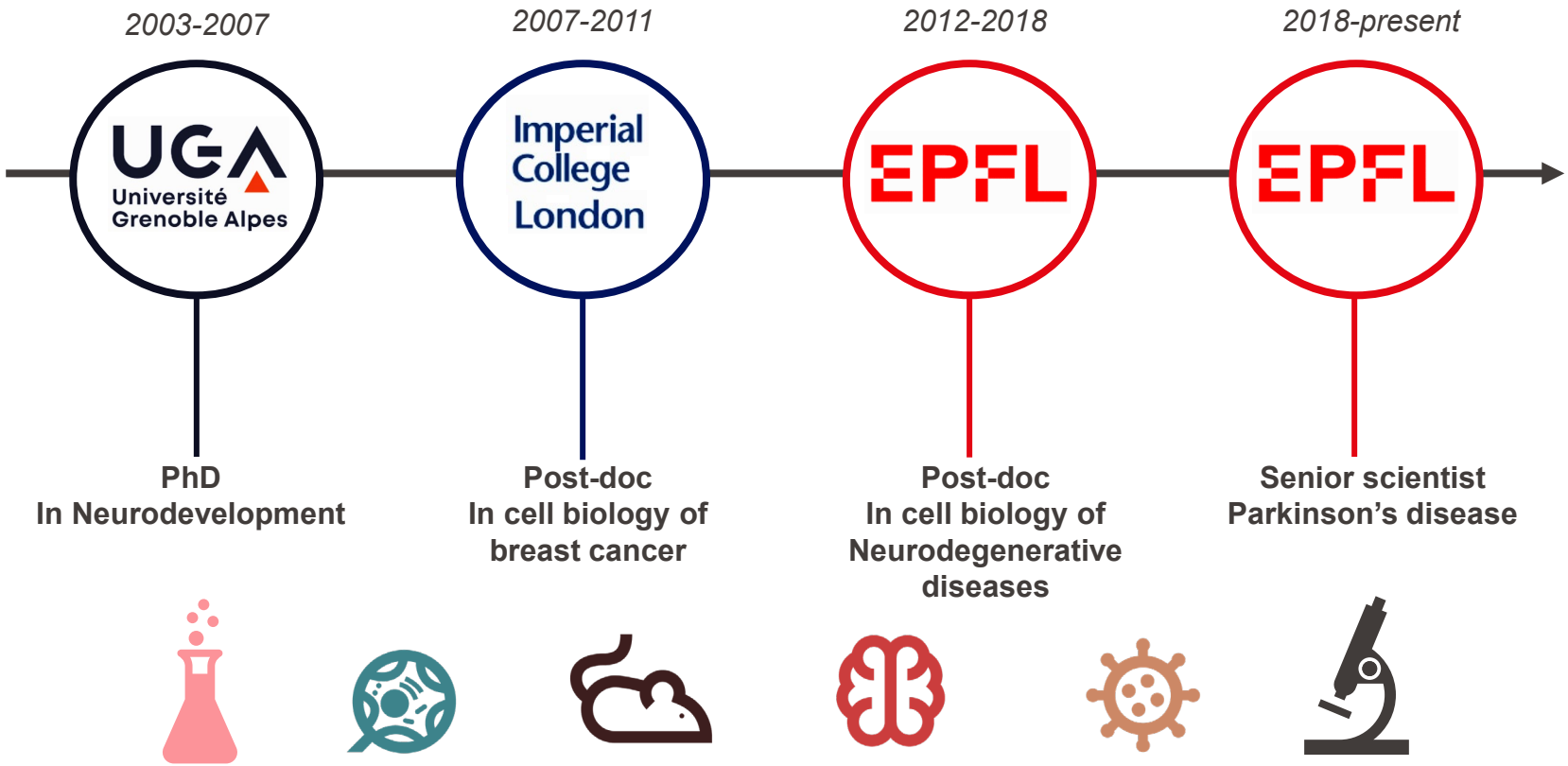
UPDANGELO's lab



Lipid Cell Biology Laboratory – Kristian Gerhard Jebsen Chair on Metabolism

The focus of our laboratory is that to understand the role of membrane lipids in the establishment of cell identity and in development. We do approach this issue by combining advanced lipidomics and lipid imaging with biochemical and cell biology techniques.

Dr. Anne-Laure Mahul-Mellier



Manel Boussouf

EPFL BSc. in Life Sciences Engineering — 2015-2019

LashuelLab Bachelor Project — Lashuel Lab– EPFL

EPFL MSc. in Life Sciences Engineering — 2019-2022
Specialization in Neurosciences and Neuroengineering

LashuelLab RA/Semester project — Lashuel Lab – EPFL

BIOSCIENCES Industry Internship — ND Biosciences – Biopôle

Master's Thesis — Khurana Lab – Harvard MS

Post-Graduation — 2019-2023

Research Assistant — Khurana Lab – Harvard MS

EPFL PhD in Neurosciences — 2023-(2027)

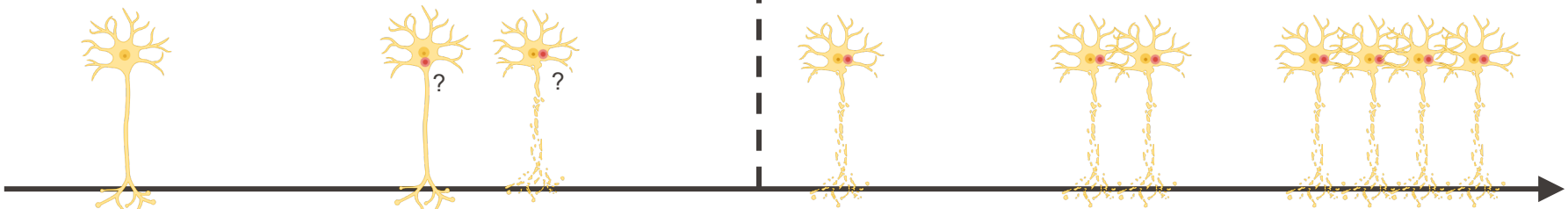
LashuelLab  Role of lipids in Parkinson's disease pathogenesis — Lashuel & D'Angelo labs

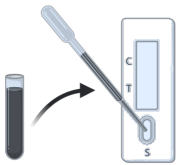
Understanding the cellular and molecular mechanisms underlying the pathogenesis of Parkinson's disease

Non-motor symptoms
Constipation
Depression
Sleep disorders
Loss of smell

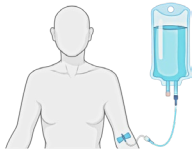
Diagnosis
~58 years

Motor Symptoms
Tremor (involuntary, rhythmic shaking)
Freezing
Bradikinesia (slowness of movement)





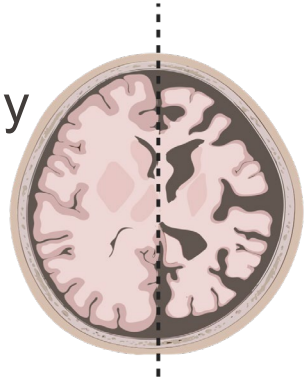
No biomarker
No test for early diagnosis



No disease modifying therapies to prevent, slow down or halt PD

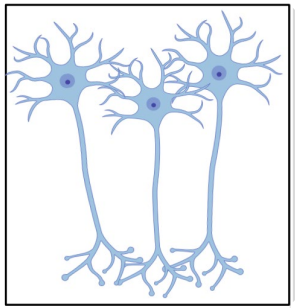
Parkinson's Disease:
Main pathological features

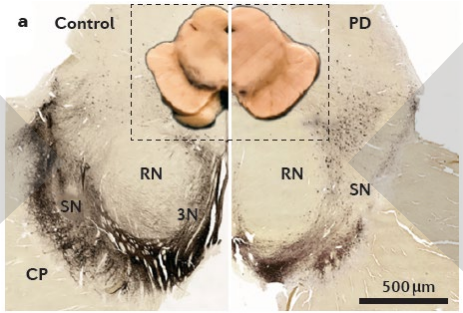
Healthy



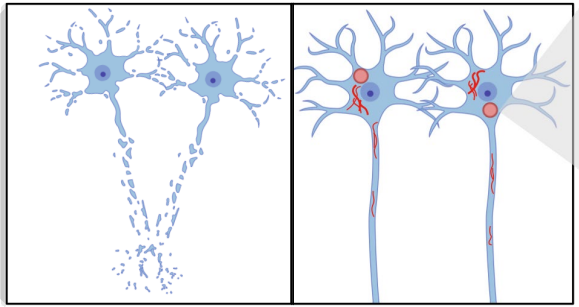
Parkinson's

1. Neuronal loss





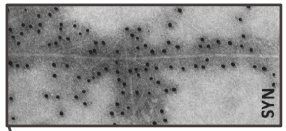
substantia nigra



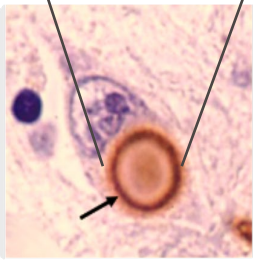
2. Neurodegeneration of dopaminergic neurons

3. Accumulation of inclusions

aSyn fibrils
(pathological form)



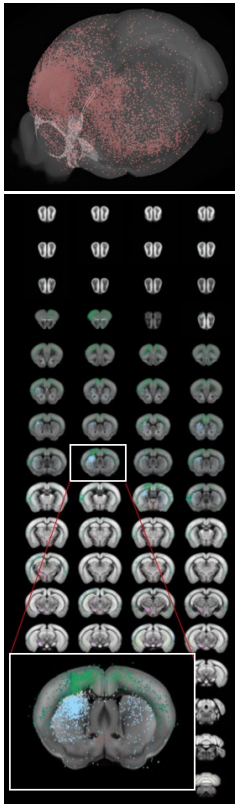
Spillantini et al., 1997

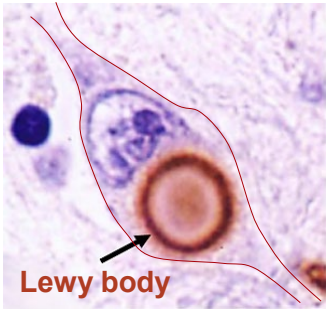


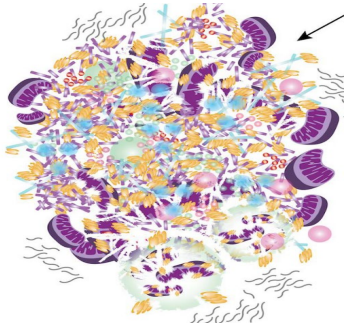
Lewy Body

Cellular and in vivo models of Parkinson's disease pathology

To understand the molecular mechanisms underlying disease pathogenesis



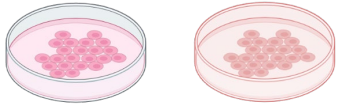




How? When? Role? Composition?

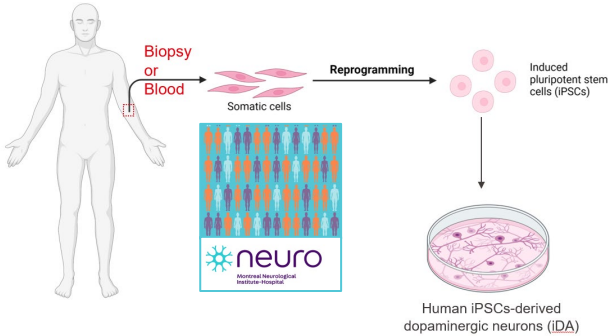
Disease-relevant Parkinson's disease Models

- **Mammalian cell lines** (HEK, HeLa, U2OS)



- **Primary neurons from mice brain**

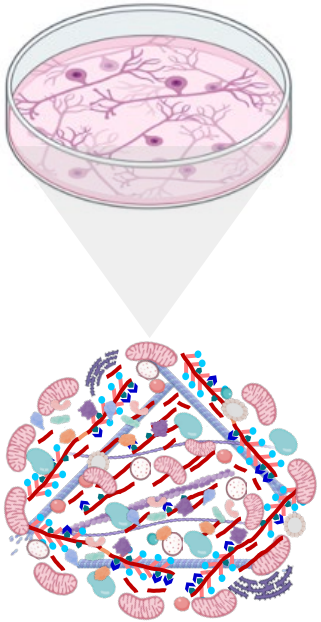
- **Human neurons-derived from patients iPSC**

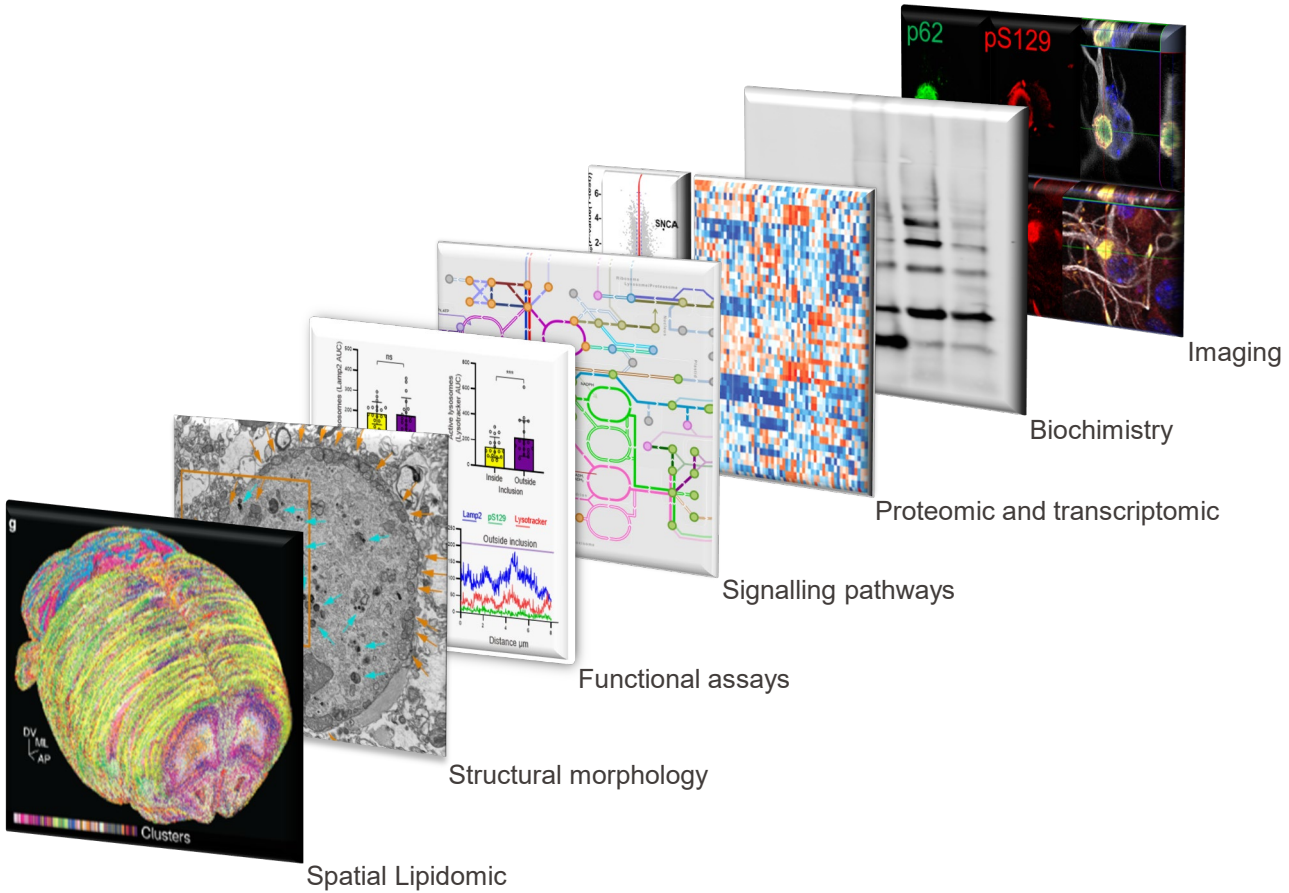


Cellular and in vivo models of Parkinson's disease pathology

To understand the molecular mechanisms underlying disease pathogenesis

Lewy body in a dish





Cellular and in vivo models of Parkinson's disease pathology

To understand the molecular mechanisms underlying disease pathogenesis

Institutions

EPFL

EPFL
Excellence in Africa - EPFL

campus biotech

Patients associations

THE MICHAEL J. FOX FOUNDATION FOR PARKINSON'S RESEARCH

Fondation Bru

Parkinson
schweiz suisse svizzera

Pharma and start-up

idorsia

ucb Inspired by patients. Driven by science.

AC Immune

Roche

Effective science requires engaging with institutions, academia, patient associations, and pharma

What does it require? Knowledge and technical expertise of the field, communication skills (written and oral), interpersonal skills (relationship with stakeholders), collaboration and teamwork (multidisciplinary teams), critical thinking, project management, ethic and integrity…..

Take-home message

Doing science extends far beyond the lab bench.

It requires more than just research skills

Successful scientists must possess strong communication, negotiation, and interpersonal skills, alongside cultural competence and ethical reasoning. By building partnerships and fostering dialogue, scientists can drive innovation and ensure that their work has a meaningful impact on society.

BIOENG-430 at glance

2-Minute introduction

2-Minute introduction:

To learn more about each other and set expectations

Proactive engagement

During the class and at home

Don't be shy, learn to raise your hand

THERE IS NO STUPID QUESTION

Critical thinking

How to gain knowledge?

Communication skills

Collaboration and teamwork

Interpersonal skills

and networking

POV Teachers

2-Minute introduction:
To learn more about each other and set expectations

1. Who are you?

•Share your preferred name and country of origin

•A bit about you: Background and scientific interests, your field of study, affiliation, major…..or if you prefer what you have done this summer

2. What are your next steps career-wise?

•Share your career aspirations or next steps.

•Do you know what you want to do after the master?

3. Why did you select BioENG-430?

•What attracted you to this specific topic?

4. What do you expect from this course?

•Are there specific skills or knowledge you wish to gain?

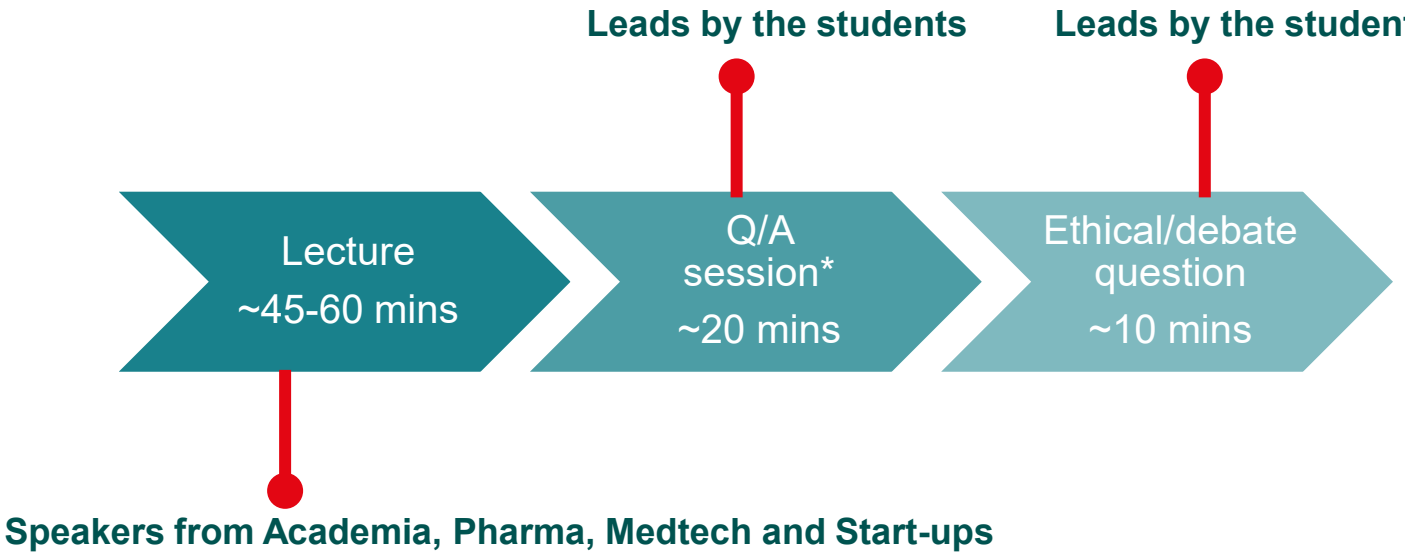
•How do you see this course fitting into your career plans?

Students

BIOENG-430 at glance

Overview of course contents

Course organisation:



* **Supporting Materials** (available on the BIOENG-430 Moodle/ one folder per class):

- **Biography of each speaker**: A brief background about each guest speaker.
- **Required readings**: Two papers relevant to the lecture, provided by the guest speaker - **must be read before class**.
- **Ethical/debate questions**: questions related to the lecture and the readings will be provided in advance by the speaker.

Course objectives:

- Gain exposure to current topics shaping the field of life sciences and biomedical research today.
- Gain an appreciation of the importance of interdisciplinary research and collaborations to address complex scientific and societal challenges.
- Learn about the various career options and opportunities in life sciences or at the interfaces of the life sciences and other disciplines
- Gain a broader understanding of the societal, economic, and ethical implications of recent and emerging scientific advances and breakthroughs.
- Improve your soft skills: scientific communication (written and oral), learning how to read a life science paper, oral presentations, collaboration, and team skills.
- Improve your analytical, research design, and critical thinking skills.
- Receive constructive feedback and support to improve all the above.

BIOENG-430 at glance

Assignement and grading

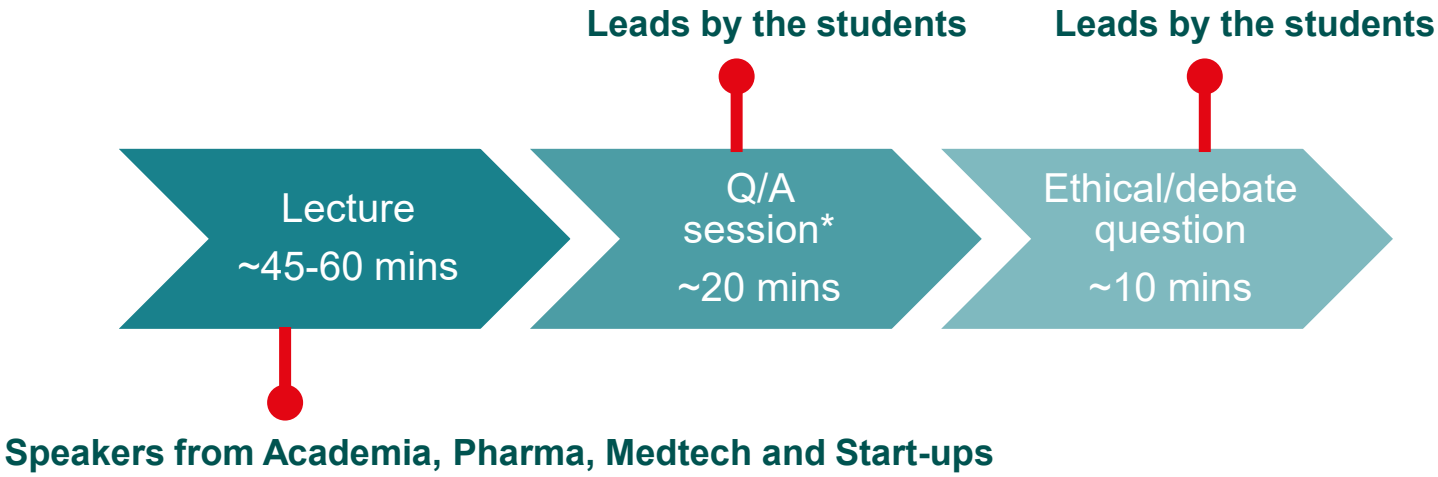
How the module will be graded?

- **Attendance (in person) is mandatory**

- If you have scheduling conflicts between this course and other courses, please see me after class or later this week

- When potential scheduling conflicts arise during the semester, please inform me ASAP – we can always find a solution

How the module will be graded?



Assignements	Number of assignement	% of the total grade
In-Class participation (Q/A session - group)	**2**	**30%**
Lecture assignement (individual)	**2**	**30%**
Semester project (individual oral presentation)	**1**	**40%**

In-Class participation (Q/A session + debate)

Group Assignment Guidelines	30%

Group size: 3-4 members per group

Work distribution: You are responsible for deciding how to divide the tasks and manage the Q&A session.

Total assignments: 2 for the semester

Tasks:
Research: Investigate the speaker's work thoroughly (use the 2 papers provided).
Q&A preparation: Be ready to lead the discussion during the Q&A session.
Interview: Prepare to interview the speaker about their career path or any other topics that interest your group.
Debate question: Prepare arguments for both the pros and cons.

Question submission: Submit all questions to me and the TA **at least one day before** the lecture.

Recommendations:
Meet as a group before the lecture to brief each other and ensure everyone is prepared.

Participation: All group members must contribute equally to the assignment.

*** All other class members are encouraged to participate as well!**

Lecture assignments

Assignment Guidelines (individual assignment)	**30%**

Total Assignments: 2 for the semester

1. Key take-home messages from the Lecture:
Highlight 4-5 key points or messages that you took away from the lecture.

2. Sum-up the key messages from 1 of the 2 papers provided by the guest speaker:
References: Include the title of the article, authors, and the journal in which it was published.
Summary: Write a brief 4-6 lines summary of the work and explain why you found it interesting.
Relevance: Explain how the topics covered in the paper connect to the lecture content.

3. Answer 1 scientific question related to the lecture
The scientific questions will be provided the day after the lecture on the folder of the Lecture in the Moodle

Examples of *Lecture assignments* from past years are available:

Moodle BioENG-430/Folder « Introduction course »

Lecture assignments - Example

Selected topics in life sciences

Jocelyn Bloch

General Feedback on the lecture

I found Jocelyn to be an excellent lecturer and a remarkable woman. The research she has done is so groundbreaking and changes peoples life for the better. I think I can speak for the full class that we have a lot of respect for her.

Her way of explaining things was very clear and calm, making it easy for everyone to grasp the topic. She was open to questions throughout, which created a welcoming environment. Despite most of us being new to the subject, she avoided diving too deeply into theoretical aspects, ensuring we could all follow along. After the lecture, I definitely felt more informed about this new topic. However, it might have been beneficial for her to explore the technical aspects further, especially for those with prior knowledge. Her presentation slides were well-organized, incorporating lots of visuals like photos and videos from her research.

Take home messages from the lecture

- DBS improves quality of life: DBS doesn't 'cure' the disease itself but significantly improves the quality of life for individuals with movement disorders by reducing motor fluctuations.
- Gene Therapy as possible solution: Gene therapy offers a potential method to shield neurons from further degeneration, presenting a promising approach for fighting movement disorders.
- Neurosurgeons love engineers: The collaboration between neurosurgeons and engineers plays a main role in advancing treatments. Especially in the field of imaging, mechanics and robotics.
- Neuromodulation: DBS helps with movement problems in Parkinson's. By using frequent and prolonged stimulation, it calms down excessive activity in the brain. To do this well, we need precise technology like robotics and advanced imaging
- Locomoteurs: Epidural electrical stimulation shows promise in bridging signal gaps in gait disorders post-spinal cord injury. Biomimetic stimulation targeting specific spinal cord hotspots, along with personalized programming, revolutionizes rehabilitation strategies, minimizing dependency on physiotherapists for stimulation adjustments.

Identify and describe a recent publication that illustrates recent advances in using neuroprosthetics, implantable neurotechnologies or neurostimulation to restore function that has been lost due to spinal cord injury or treat specific medical conditions

Paper: 'Neurostimulation for Stroke Rehabilitation'

Summary:

The research delves into the topic of neuroplasticity (how the brain can learn to regain movement after a stroke by 'rewiring' itself). Usual therapies might not always work sufficiently, so there is a large need for techniques to assist this rewiring process. One of these techniques is neurostimulation, particularly closed-loop systems and optogenetics, to induce more precise and targeted neural reorganization. The researchers plead for advancing research into plasticity principles to revolutionize rehabilitation and help more people recover from brain injuries.

Why?:

Stroke is ranked as the second leading cause of death worldwide with an annual mortality rate of about 5.5 million. Not only does the burden of stroke lie in the high mortality but the high morbidity also results in up to 50% of survivors being chronically disabled [1].

These numbers sound horrifying to me and show that stroke is a disease of immense public health importance with serious economic and social consequences. In addition, I recently read an article saying that the prevalence of strokes is only growing. As this disease is something that every person probably will encounter for themselves or their loved ones, I found knew I wanted to choose an article talking about new methods to treat patients who suffered a stroke.

The paper addresses innovative methodologies to battle this problem. It combines medicine and engineering, which for me as an engineer is always interesting to look into.

Take home messages:

- Despite conventional therapies, post-stroke recovery remains slow and incomplete due to limited neural reorganization.
- Precise neurostimulation methods like closed-loop systems and optogenetics show promise in inducing targeted neural changes for improved recovery.
- More focused stimulation techniques could enhance neural plasticity, especially closed-loop systems and optogenetics, aiding functional brain reorganization.
- Integrating closed-loop systems and optogenetics, alongside understanding plasticity principles, may revolutionize post-stroke recovery and neuroscience rehabilitation.

Questions on Topics covered in the lecture

Answers based on paper 'A spinal cord neuroprosthesis for locomotor deficits due to Parkinson's disease' [2]

- *Using words and schematic depictions explain the main conceptual and technological advances that enabled Prof. Bloch and colleagues to develop treatments that allowed their Parkinson's patient to walk again.*

  Instead of focusing only on the brain, they targeted the lumbosacral spinal cord. This area is responsible for generating walking motions and isn't directly affected by Parkinson's disease (PD). Targeted epidural electrical stimulation (EES) of the lumbosacral spinal cord influences the activity of motor neurons by activating large-diameter afferents [2]. This allows for real-time control over leg motor neurons and muscles. The technique targets so called 'hotspots' in the spinal cord by precisely timing the stimulation to mimic how the body normally activates leg muscles (=biomimetic stimulation). It has successfully helped paralyzed individuals regain the ability to stand, walk, cycle, and even swim [2].

- *What specific symptoms of Parkinson's disease does this therapy aim to treat and what measure did the investigators take to optimize this treatment to the specific needs of their patient?*

  The specific symptoms treated are locomotor deficits, which include gait impairments, balance problems and freezing-of-gait episodes [2].

  Personalized programmation with tailored implanted electrodes, these tell what places are best to stimulate and delivers a personalized stimulation. They generated a personalized neurobiomechanical model47 actuated by a reflex-based circuit that allowed us to estimate the optimal activation of muscles during walking that was expected by P1 in the absence of PD [2].

- *Describe some of the main limitations of this approach*

  The neuroprosthesis was tested on a small scale, primarily in non-human primates (NHPs) and validated in only one person with Parkinson's disease (PD). The effectiveness across a broader spectrum of PD patients remains uncertain. Moreover, parkinson's disease manifests with a wide range of symptoms and degrees of severity in locomotor deficits. It's unclear if this neuroprosthesis will effectively address these diverse issues in the entire PD population.

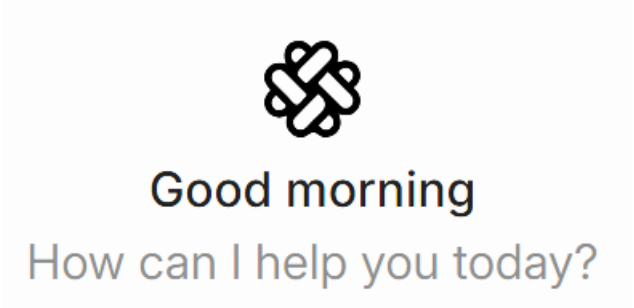
  Scaling up the therapy requires advanced, purpose-built technologies. This involves creating electrode arrays customized for each person's specific nerve entry zones in the spine, along with a device that controls the electrical stimulation very precisely.

  The synchronization of the neuroprosthesis with motor intentions requires the identification of the optimal tradeoff among invasiveness, reliability and practicality of the technology used to detect motor intentions [2]. Patients prefer using wearable sensors that aren't invasive, as long as they're reliable and practical for daily use.

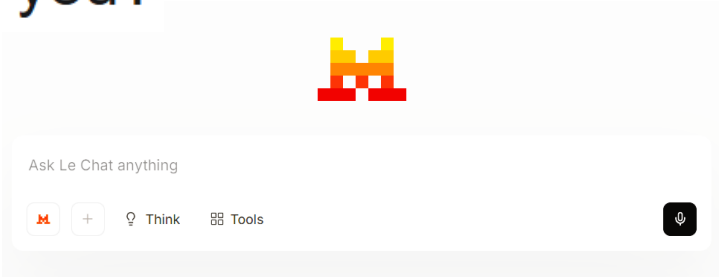
Examples of *Lecture assignments* from past years are available:

Moodle BioENG-430/Folder « Introduction course »

Lecture assignments
ChatGPT or not chatGPT?

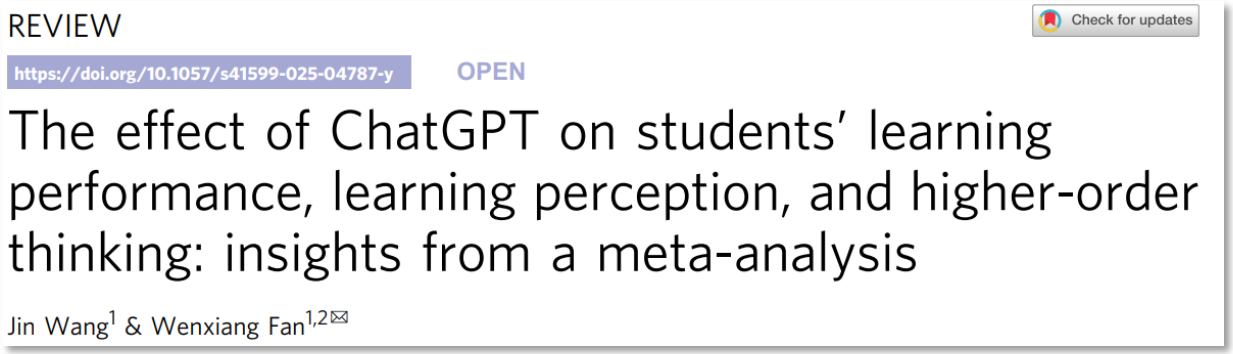


How can I assist you?



ChatGPT or not chatGPT?

Use it as a tool rather than a substitute for learning



REVIEW

Check for updates

https://doi.org/10.1057/s41599-025-04787-y OPEN

The effect of ChatGPT on students' learning performance, learning perception, and higher-order thinking: insights from a meta-analysis

Jin Wang[1] & Wenxiang Fan[1,2]✉

1. Think first by yourself

Draft your ideas and answers on your own. This is how you actually learn.

2. Use AI to polish, not to think for you

Let it help with **grammar, flow, or phrasing**, but keep the ideas yours.

3. Check what it gives you

Always verify facts, data, and references: AI makes mistakes (particularly for the references) !!!!

4. Add an AI disclosure

At the end of your assignment, include an AI use disclosure, write one sentence like:

"I used [tool name, e.g., ChatGPT] to [brief description of use, e.g., improve grammar and clarity in this text or brainstorm ideas] while preparing this assignment."

Semester project

Assignment Guidelines (individual assignment)	**40%** 25% oral presentation 15% Q/A session

Total Assignments: 1 for the semester

When: In December

Select a topic of interest that made the headlines recently.
Relevant fields: Any topic/discovery/breakthrough at the interface of

- Life Sciences
- Medicine
- Bioengineering
- Chemical biology

Presentation outline (~10-15 mins):

a) Introduce the scientific background of the topic and why you selected this topic (2-3 slides)
b) identify the main challenges or unanswered questions (1 slide)
c) Highlight the major societal, economic, social and/or ethical implications in this field (1 slide)
d) What is the main finding/discovery/breakthrough, and how will it impact the relevant field and society? (2 slides)
e) Highlight emerging trends in the relevant fields + How do you see this field evolving during the next 5-10 years? (1 slide)
f) Share with us the views on future exciting developments in the selected field (1 slide)

Q/A session (~5-10 mins)

Examples of *Semester projects* from past years are available: **Moodle BioENG-430/Folder « Introduction course »**

BIOENG-430 at glance

Guest speakers

Guest speakers - Schedule

23/09	30/09	7/10	14/10	21/10	28/10	4/11	11/11	18/11	25/11
Sanna Fowler	Sébastien Nusslé	Eduardo Moraud	Juliane Da Garca		Elpida Tsika	Gregory Servotte	Madiha Derouazi	Carole Estoppey	Bernard Schneider
Lonza	genknowme	Unil/CHUV	EPFL		AcImmune	Edwards Life siences	Acimmune	Nestlé	PTBTG
Pharma	**Start-up**	**Academia**	**Academia**	**FALL BREAK**	**BioTech**	**Pharma**	**Start-up**	**Industry**	**Academia**
https://www.lonza.com	https://genknowme.com	http://emmoraud.net/	https://www.epfl.ch/labs/dangelo-lab/		https://www.acimmune.com/	https://www.edwards.com/fr	https://www.acimmune.com	https://www.nestle.com/	https://www.epfl.ch/research/facilities/gene-therapy

Where to find more information before the class:

- about the selected topic? Check the website of the company or the lab, google, PubMed…..
- about the speaker? LinkedIn, google, website of the company or the lab

Guest speakers

Lonza

Head of Strategy, Innovation & Value Chain Management

Lonza Bioconjugates

SANNA FOWLER

Translate bioconjugates discovery to the clinic

Education & Training

DOCTOR OF PHILOSOPHY

1998-2001
Immunology, Molecular and Cellular Science
University of Oxford, UK

POSTDOCTORAL RESEARCH FELLOW

2001-2002
Immunology Research
University of Oxford, UK

SENIOR SPONSORSHIP ACCOUNT MANAGER

2002-2010
Team Alinghi SA
Americas Cup Swiss sailing

DEPUTY DIRECTOR OF COMMUNICATIONS

2011 - 2014
EPFL - Lausanne - CH

DEPUTY DIRECTOR OF DEVELOPMENT

2014 - 2017
EPFL - Lausanne - CH

EXECUTIVE DIRECTOR, HEAD OF DIVISIONAL PROJECTS

2021 - 2023
Lonza
Basel - Switzerland

HEAD OF STRATEGY, INNOVATION & VALUE CHAIN MANAGEMENT

2023 - Present
Lonza
Basel - Switzerland

Profile

Sanna Fowler is currently Head of Strategy and Innovation for Lonza's bioconjugates unit and focuses on future growth through technology and manufacturing capacity. Her goal is to support small biotech and large pharma companies translate bioconjugate discovery into the clinic and to ensure development and manufacturing keep up with the demand for innovative medicines.

Articles

CTLA-4 expression on antigen-specific cells but not IL-10 secretion is required for oral tolerance

Press

EURAXESS Researchers in motion Interview with Dr Sanna Fowler: A passionate person about Science

@ SannaFowler
linkedin.com/in/sannafowler
sanna.fowler@gmail.com

genknowme

Co-Founder, CEO & CSO

genknowme
Lausanne, CH

SEBASTIEN NUSSLÉ

Genetic & Epigenetic

Education & Training

DOCTOR OF PHILOSOPHY

2006 - 2012
Ecology and evolution
Université de Lausanne - CH

RESEARCHER

2010-2013
La maison de la rivière
Tolochenaz - CH

POSTDOCTORAL RESEARCHER

2012-2013
University of Bern
Bern, Switzerland

POSTDOCTORAL RESEARCHER

2013-2017
UC Berkeley
USA

BIOLOGY TEACHER

2019-2024
VAUD - Switzerland

CSO

2019 - 2020
genknowme
Lausanne, Switzerland

Interim CEO / CEO

2020 - Present
genknowme,
Lausanne, Switzerland

Profile

Sebastien is an experienced researcher in biostatistics (PhD, University of Lausanne) with postdoctoral experience (University of Bern, University of California Berkeley). He is specialized in genetic and environment interactions. Passionate by science vulgarization and wellbeing, he co-founded Genknowme, the Swiss epigenetic company, with the will to democratizing this emerging technology to help everyone becoming healthier. Trained in ecology and founder of an environmental firm, Sébastien is also aware of environmental issues and has the will to drive the company with a sustainable mindset.

Articles

- Examining nutrition strategies to influence DNA methylation and epigenetic clocks: a systematic review of clinical trials
- Maintaining brain health across the lifespan

Press

- Genknowme révèle notre âge biologique
- Genknowme on the expansion course

linkedin.com/in/snussle
genknowme.ch
sebastien@genknowme.com

Guest speakers

Associate Professor

UNIL/CHUV
Lausanne, Switzerland

EDUARDO MORAUD

Associate Professor/
Neurology

Education & Training

DOCTOR OF PHILOSOPHY
2010-2014
Neuronal Engineering
ETH Zurich - Switzerland

POSTDOCTORAL RESEARCH FELLOW
2014-2015
EPFL - Lausanne, Switzerland

POSTDOCTORAL RESEARCH FELLOW
2015-2018
University of Oxford, UK

POSTDOCTORAL RESEARCH FELLOW
2018-2019
CHUV/UNIL - Lausanne, Switzerland

JUNIOR PRINCIPAL INVESTIGATOR
2019-2023
CHUV/UNIL - Lausanne, Switzerland

RESEARCH GROUP LEADER
2024 - Present
UNIL/CHUV
Lausanne - Switzerland

Profile

Dr. Eduardo Moraud holds a PhD in Neural Engineering and is an Assistant Professor at the Faculty of Biology and Medicine of the Université de Lausanne (UNIL). He also leads a research group at the Lausanne University Hospital (CHUV). His work focuses on the development of smart neuromodulation therapies that dynamically interact with the nervous system using neural and motor performance feedback. By integrating real-time recording and stimulation of multiple neural structures, Dr. Moraud aims to optimize therapies to address motor deficits caused by Parkinson's disease and related neurological disorders.

KEYOWRDS

Neural Engineering; Neuromodulation; Parkinson's Disease; Real-time Neural Recording; Motor Performance Feedback; Adaptive Therapies

PUBLICATIONS

https://pubmed.ncbi.nlm.nih.gov/?term=Eduardo+Martin+Moraud++&sort=date

https://www.linkedin.com/in/eduardomartinmoraud/

http://emmoraud.net/

POSTDOCTORAL RESEARCHER

EPFL
Lausanne, Switzerland

JULIANE DA GRACA

Education & Training

MASTER THESIS
2019-2020
Cell biology
Institut Pasteur- France

DOCTOR OF PHILOSOPHY
2020-2025
Cell biology
Institut Necker- France

POSTDOCTORAL RESEARCH FELLOW
2025-present
EPFL - Lausanne, Switzerland

Profile

Dr. Juliane Da Graça developed her passion for cell biology in high school, earning a Bachelor's at Aix-Marseille University and a Master's in Cellular and Molecular Biology at Sorbonne Université. At the Institut Pasteur, in Chiara Zurzolo's lab, she studied Tau fibrillation and autophagy dysfunction in neurodegeneration. She completed her PhD in Etienne Morel's team at Institut Necker Enfants Malades, uncovering how endoplasmic reticulum-endosome contact sites regulate autophagy using advanced imaging and proteomics approaches. Since January 2025, she has been a postdoctoral researcher in Giovanni D'Angelo's lab at EPFL, exploring membrane biology and cellular dynamics.

KEYOWRDS

Cell biology, autophagy, membrane biology, organelle contact sites, neurodegeneration, advanced imaging

PUBLICATIONS

https://pubmed.ncbi.nlm.nih.gov/?term=Juliane+Da+Gra%C3%A7a&sort=date

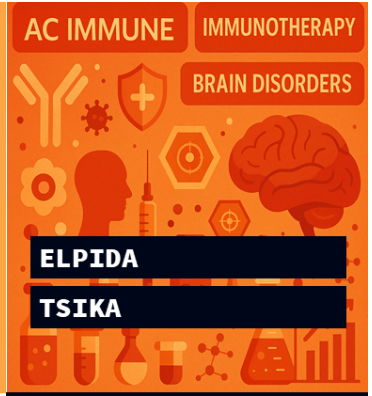
https://pubmed.ncbi.nlm.nih.gov/?term=Juliane+Da+Gra%C3%A7a&sort=date

juliane.dagraca@epfl.ch

Guest speakers

Group Leader

AcImmune
Lausanne, Switzerland



ELPIDA TSIKA

Education & Training

DOCTOR OF PHILOSOPHY
2005-2010
Democritus Uni of Thrace - Greece

POSTDOCTORAL RESEARCH FELLOW
2010-2014
EPFL - Lausanne, Switzerland

SCIENTIST
2014-2015
NeuroAssests

TEAM LEADER
2019-2023
AcImmune
Lausanne, Switzerland

SENIOR TEAM LEADER
2023-2024
AcImmune
Lausanne, Switzerland

GROUP LEADER
2024 - *Present*
AcImmune
Lausanne, Switzerland

Dr. Elpida Tsika, PhD, has over 15 years of experience in Parkinson's disease (PD) research across academia and industry. She trained at the University of Pennsylvania in Dr. Harry Ischiropoulos' lab, focusing on the selective vulnerability of dopamine neurons to alpha-synuclein aggregates, and later completed her postdoc at EPFL with Dr. Darren Moore, contributing to the development and characterization of PD animal models. At **AC Immune**, she leads the alpha-synuclein biology team, driving the development of diagnostics and therapeutics for PD and other synucleinopathies caused by toxic alpha-synuclein accumulation.

KEYOWRDS

Alpha-synuclein biology, Parkinson's disease, neurodegeneration,small molecules, animal and cellular models, drug discovery

PUBLICATIONS

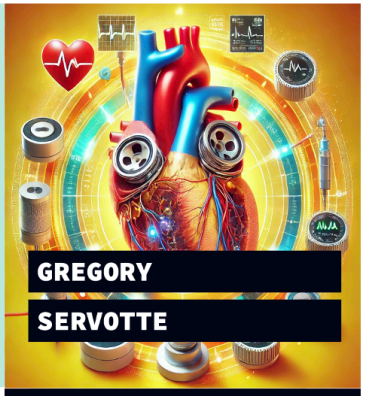
https://pubmed.ncbi.nlm.nih.gov/?term=Elpida+Tsika&sort=date

https://www.linkedin.com/in/elpida-tsika-31567b91/?originalSubdomain=ch

https://www.acimmune.com/

Senior Vice President

Edwards Lifesciences
Nyon, Switzerland



GREGORY SERVOTTE

Education & Training

MASTER OF ENGINEERING
1994 - 1998
ECAM Brussels Engineering School
Belgium

SOFTWARE ENGINEER
1998-2001
Alcatel Microelectronics,
Brussels - Belgium

MASTER IN MANAGEMENT
2003 - 2005
ICHEC Brussels Management School
Belgium

CLINICAL AND TECHNICAL CONSULTANT
2004-2007
Medtronic
Brussels - Belgium

MARKETING MANAGER / GROUP MARKETING DIRECTOR
2007 - 2017
Medtronic,
Lausanne, Switzerland

SENIOR BUSINESS DIRECTOR / SENIOR VICE PRESIDENT
2017 - 2024
EDWARDS lifesciences,
Nyon, Switzerland

Profile

Gregory Servotte is a passionate and visionary leader in the MedTech industry, currently serving as the Senior Vice President in the Transcatheter Heart Valve (THV) division at Edwards Lifesciences. With a proven track record of driving growth and implementing strategic plans, Gregory excels in building strategic partnerships and fostering high-performing teams. His deep understanding of medical devices and healthcare technology, combined with his focus on regulatory compliance, allows him to lead innovations aimed at improving patient outcomes and revolutionizing the healthcare experience

Press

Edwards launches Sapien 3 Ultra Resilia TAVR in Europe

linkedin.com/in/gregservotte

gregory_servotte@edwards.com

Guest speakers

Chief Scientific Officer

SwitchKine
Lausanne, Switzerland

MADIHA DEROUAZI

Education & Training

DOCTOR OF PHILOSOPHY
2001-2005
Biotechnology
EPFL - Switzerland

POSTDOCTORAL RESEARCH FELLOW
2001-2002
Bacterial vector engineering, Cancer vaccine, Tumor associated antigens screening
CNRS, Paris - France

MAITRE ASSISTANTE
2009-2014
HUG - Genève, Switzerland

CEO
2012 - 2022
Amal Therapeutics - Geneva - CH

CEO
2021 - 2023
Speransa Therapeutics
Frankfurt - Germany

CSO
2024 - Present
AC Immune
Lausanne - Switzerland

CEO
2025 - Present
SwitchKine
Lausanne - Switzerland

Profile

Dr. Madiha Derouazi holds a PhD in Cellular Biotechnology from EPFL and is a recognized leader in immuno-oncology. In 2012, she founded AMAL Therapeutics, developing next-generation cancer vaccines, and served as CEO and CSO until its acquisition by Boehringer Ingelheim. She later became CEO of Speransa Therapeutics, advancing a novel platform for prophylactic vaccines, and served as CSO at AC Immune. Since 2025, she is CEO of the Biopôle-based start-up SwitchKine.

Articles

Novel Multi-Antigen Orf-Virus-Derived Vaccine Elicits Protective Anti-SARS-CoV-2 Response in Monovalent and Bivalent Formats.

Press

"When you're an entrepreneur, you need to do things your way"

linkedin.com/in/madiha-derouazi

madiha@switchkine.com

PROJECT MANAGER
Nestlé Research
Lausanne, Switzerland

CAROLE ESTOPPEY

Education & Training

DOCTOR OF PHILOSOPHY
2011-2014
Chemical biology applied to neurodegenerative diseases
EPFL - Lausanne, Switzerland

SENIOR INVESTIGATOR
2015-2019
IchnosSciences- Lausanne, Switzerland

PRINCIPAL SCIENTIST AND PROJECT LEADER
2019-2021
IchnosSciences- Lausanne, Switzerland

SENIOR PRINCIPAL SCIENTIST AND PROJECT LEADER
2021-2023
IchnosSciences- Lausanne, Switzerland

PROJECT MANAGER AT NESTLÉ RESEARCH
2023-present
Nestlé Research
Lausanne, Switzerland

Profile

Dr. Carole Désobry is a biotechnology expert with a strong background in antibody engineering, protein expression, and project management. At Ichnos Sciences SA (2015-2023), she advanced from Senior Investigator to Senior Principal Scientist, leading teams and driving multispecific antibody projects from discovery to clinical development in immuno-oncology. Since 2023, she has been Project Manager at Nestlé Research, leading cross-functional projects for the Nestlé Institute of Health Sciences in collaboration with PetCare and Nutrition divisions.

KEYOWRDS

Biotechnology, antibody engineering, protein expression, immuno-oncology, project management, drug discovery, cross-functional leadership.

PUBLICATIONS

https://pubmed.ncbi.nlm.nih.gov/?term=carole+desobry

Carole Estoppey | LinkedIn

carole.desobry@gmail.com

Guest speakers

Head of Bertarelli Foundation Gene Therapy Platform
Campus Biotech
Genève, CH

Education & Training

DOCTOR OF PHILOSOPHY
1995 - 2001
Gene Therapy
University of Lausanne - CH

POSTDOCTORAL FELLOW
2001-2003
EPFL,
Lausanne, Switzerland

ASSISTANT SCIENTIST
2003-2006
University of Wisconsin
USA

SENIOR SCIENTIST
2007 - Present
EPFL,
Lausanne, Switzerland

Profile

Dr. Bernard Schneider is a prominent neuroscientist and a Research and Teaching Associate at the Brain Mind Institute of EPFL. He leads the Bertarelli Gene Therapy Platform, focusing on developing viral vectors for gene therapies targeting neurodegenerative diseases and sensory organ disorders, such as ALS, deafness, and blindness. With over 16 years of experience in neuroscience, Dr. Schneider has authored more than 100 publications and is a key figure in translational research

Articles

- Long term peripheral AAV9-SMN gene therapy promotes survival in a mouse model of spinal muscular atrophy
- Stable isotope labeling and ultra-high-resolution NanoSIMS imaging reveal alpha-synuclein-induced changes in neuronal metabolism in vivo
- Recovery of walking after paralysis by regenerating characterized neurons to their natural target region

linkedin.com/in/bernard-schneider-9894792
www Bertarelli Foundation Gene Therapy Platform
bernard.schneider@epfl.ch

Learning outcomes

- Gain exposure to exciting science and research at the frontiers of the life sciences and medicine.
- Learn about ongoing exciting interdisciplinary research at the EFPL
- Gain an appreciation of how advances in the life sciences impact the quality of life, help us address global challenges, and improve the quality of healthcare delivery today.
- Acquire new skills in scientific reading and communication
- Gain insight on how to navigate career options and opportunities in the life sciences.

BIOENG-430 at glance

How to provide feedbacks ?

Feedback importance and guidelines

Your feedback is crucial for enhancing the quality of the class (for next year).

•You will be asked to provide feedback several times during the semester.

a) on the **lecture quality** and the guest speaker

b) on the **overall quality of the course** – IS academia surveys will be conducted around the fall break and at the end of the course.

•Aim to be constructive in your feedback by mentioning both the positive aspects and areas for improvement. Ensure that criticisms are constructive and beneficial for the entire class.

•For personal requests or issues, it is best to communicate directly with the instructor or TAs as soon as the issue arises, so changes can be made promptly.

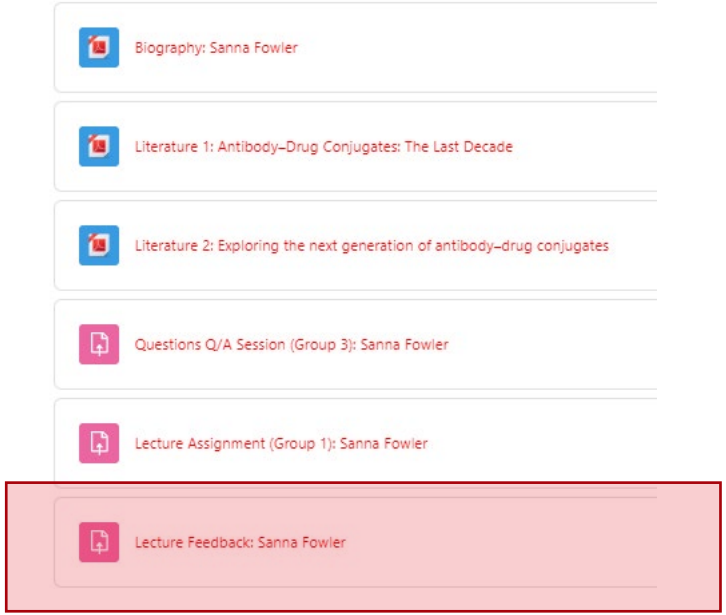
Feedback importance and guidelines

General Feedback on the Lecture (5-6 lines)

- **Clarity:** Was the information presented in a clear and understandable manner?
- **Content:** Was the material relevant, comprehensive, and well-structured?
- **Presentation:** Was the delivery engaging, well-paced, and effective?
- **Other comments:** Any additional thoughts or suggestions for improvement?

To be sent in the week max after the Lecture – on the Moodle

Feedback on the class



Feedback – Do and Don't

Good Example (Do)

•**Be specific:**
Provide detailed observations about what worked well and what could be improved.
•**Be respectful and positive:**
Focus on the content and delivery, not on the person.
•**Offer suggestions:**
Give concrete suggestions for improvement.
•**Use "I" statements:**
Frame feedback from your perspective to avoid sounding accusatory.

Constructive feedback example:
"I really appreciated the examples you used during the lecture, especially the case study about renewable energy. It made the concept much clearer for me. However, I found that the pace was a bit fast at times, and I struggled to keep up with the notes. It might be helpful to provide a summary slide or handout at the end of each section. This would allow us to review key points and ensure we understand the material fully. Overall, your enthusiasm for the topic was evident, which made the lecture more engaging."

Bad Example (Don't)

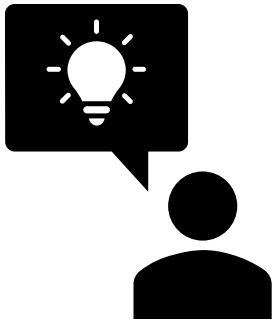
•**Be vague:** Provide non-specific feedback that does not give any useful information.
•**Be negative or personal:** Critique in a way that feels like an attack on the person, not the content.
•**Offer no solutions:** Give feedback without any constructive advice or suggestions for improvement.
•**Use "You" statements:** These can come across as accusatory or blaming.

Non-constructive feedback example:
"Your lecture was confusing and too fast.
I did not like it, and it did not make any sense.
You should prepare better next time."

BIOENG-430 at glance

Group assignement organisation

Discussion on the course contents and expectations



Organisation of the groups for the Q/A session

16/16	Name First Name	Section	e-Mail	Semester of registration	Group
1	Aktas Feriha	CGC_ING	feriha.aktas@epfl.ch	Master semester 1	Group 1
2	Belgharbia Emna	CGC_ING	emna.belgharbia@epfl.ch	Master semester 1	Group 1
3	Bernard Manon	SIE	manon.bernard@epfl.ch	Master semester 3	Group 1
4	Blaga Alexandre	GM	alexandre.blaga@epfl.ch	Master semester 3	Group 1
5	Bonaldi Pietro	CGC_ING	pietro.bonaldi@epfl.ch	Master semester 1	Group 2
6	Brand Emma	CGC_ING	emma.brand@epfl.ch	Master semester 1	Group 2
7	Dengler Ella	CGC_ING	ella.dengler@epfl.ch	Master semester 1	Group 2
8	Gfeller Malo	MTEE	malo.gfeller@epfl.ch	Master semester 1	Group 2
9	Hamouni Inès	CGC_ING	ines.hamouni@epfl.ch	Master semester 1	Group 3
10	Hendrata Jessica	CGC_ECH	jessica.hendrata@epfl.ch	Autumn semester	Group 3
11	Idris Mubarak	EDBB	mubarak.idris@epfl.ch		Group 3
12	Pachebat Grégoire	SV	gregoire.pachebat@epfl.ch	Master semester 3	Group 3
13	Praat Lara	CGC_ECH	lara.praat@epfl.ch	Autumn semester	Group 4
14	Sonnenhol Julia	CGC_ECH	julia.sonnenhol@epfl.ch	Autumn semester	Group 4
15	Trigon-Pacalet Alice	SV	alice.trigon-pacalet@epfl.ch	Master semester 1	Group 4
16	Uluç Irem	SV	irem.uluc@epfl.ch	Master semester 1	Group 4

Organisation of the groups for the assignments

	23/09	30/09	7/10	14/10	21/10	28/10	4/11	11/11	18/11	25/11
	Sanna Fowler	Sébastien Nusslé	Eduardo Moraud	Juliane Da Garca	FALL BREAK	Elpida Tsika	Gregory Servotte	Madiha Derouazi	Carole Estoppey	Bernard Schneider
	Lonza	genknowme	Unil/CHUV	EPFL		AcImmune	Edwards Life siences	Acimmune	Nestlé	PTBTG
	Pharma	Start-up	Academia	Academia		BioTech	Pharma	Pharma	Industry	Academia
	https://www.lonza.com	https://genknowme.com	http://emmoraud.net/	https://www.epfl.ch/labs/dangelo-lab/		https://www.acimmune.com/	https://www.edwards.com/fr	https://www.acimmune.com	https://www.nestle.com/	https://www.epfl.ch/research/facilities/gene-therapy
Lecture assignement Groups for the Q/A session	Group 1	Group 2	Group 3	Group 4		Group 1	Group 2	Group 3	Group 4	No assignment Time will be allocated to the semester project
Groups for the Q/A session	Group 3	Group 4	Group 1	Group 2		Group 3	Group 4	Group 1	Group 2	Volunteers (bonus)

Organisation of the groups for Semester project

	2/12	9/12	16/12
Semester project	Groups 1 + 2	Groups 2+3	Groups 3+4

Attendance (in person) is mandatory for the 3 classes in December

BIOENG-430

How to read a life science paper efficiently?

Class 16/09/24

How to read a life science paper efficiently?

A refresher and/or introduction (?) on how to read efficiently a life science paper

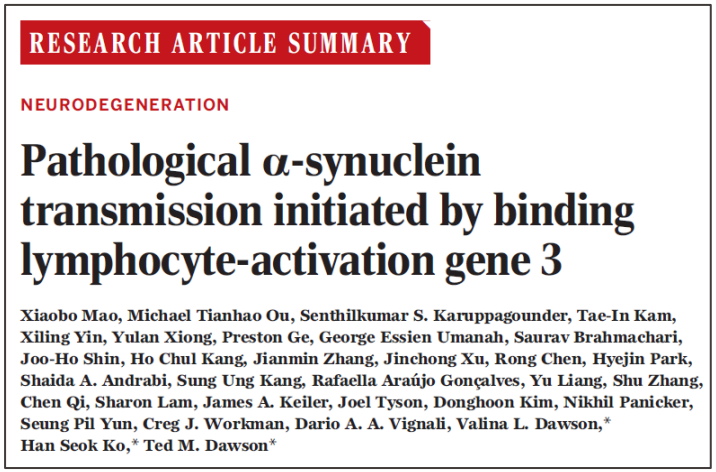
Overview of the course (16/09):

- Importance of reading scientific papers (in life sciences)
- Understand the structure of a scientific paper and determine your focus areas to allocate your time effectively
- The different strategies and techniques for reading scientific papers effectively
- Learn how to engage in critical thinking

Learn how to engage in critical thinking:

Comparing two scientific papers that present contradictory conclusions on the same topic

1



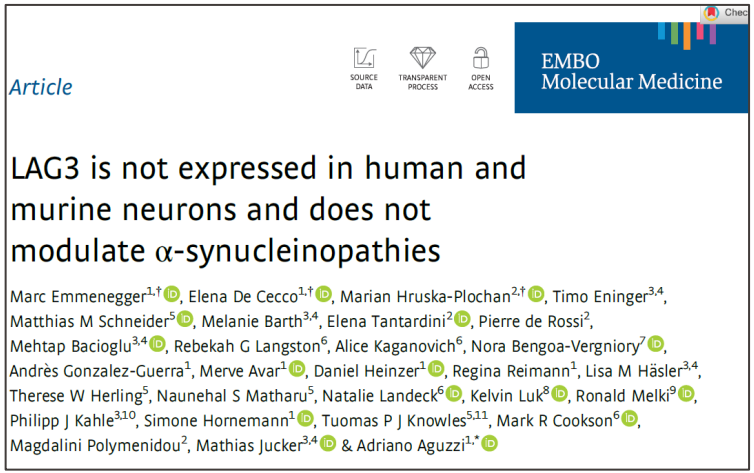
RESEARCH ARTICLE SUMMARY

NEURODEGENERATION

Pathological α-synuclein transmission initiated by binding lymphocyte-activation gene 3

Xiaobo Mao, Michael Tianhao Ou, Senthilkumar S. Karuppagounder, Tae-In Kam, Xiling Yin, Yulan Xiong, Preston Ge, George Essien Umanah, Saurav Brahmachari, Joo-Ho Shin, Ho Chul Kang, Jianmin Zhang, Jinchong Xu, Rong Chen, Hyejin Park, Shaida A. Andrabi, Sung Ung Kang, Rafaella Araújo Gonçalves, Yu Liang, Shu Zhang, Chen Qi, Sharon Lam, James A. Keiler, Joel Tyson, Donghoon Kim, Nikhil Panicker, Seung Pil Yun, Creg J. Workman, Dario A. A. Vignali, Valina L. Dawson,* Han Seok Ko,* Ted M. Dawson*

2



Article

SOURCE DATA | TRANSPARENT PROCESS | OPEN ACCESS

EMBO Molecular Medicine

LAG3 is not expressed in human and murine neurons and does not modulate α-synucleinopathies

Marc Emmenegger[1,†], Elena De Cecco[1,†], Marian Hruska-Plochan[2,†], Timo Eninger[3,4], Matthias M Schneider[5], Melanie Barth[3,4], Elena Tantardini[2], Pierre de Rossi[2], Mehtap Bacioglu[3,4], Rebekah G Langston[6], Alice Kaganovich[6], Nora Bengoa-Vergniory[7], Andrès Gonzalez-Guerra[1], Merve Avar[1], Daniel Heinzer[1], Regina Reimann[1], Lisa M Häsler[3,4], Therese W Herling[5], Naunehal S Matharu[5], Natalie Landeck[6], Kelvin Luk[8], Ronald Melki[9], Philipp J Kahle[3,10], Simone Hornemann[1], Tuomas P J Knowles[5,11], Mark R Cookson[6], Magdalini Polymenidou[2], Mathias Jucker[3,4] & Adriano Aguzzi[1,*]

PDFs are in the **Moodle BioENG-430/Folder « How to read efficiently scientific paper»**

Carefully read both papers in the indicated order (1 then 2) and find the controversy !

Learn how to engage in critical thinking: Tips and Hints

Comparing two scientific papers that present contradictory conclusions on the same topic

For each paper, identify and summarize the following components:

A. Identify key components:

- **Research question:** What question or problem is the paper trying to address?
- **Hypothesis:** What is the hypothesis or hypotheses stated in the paper?
- ***Methodology:*** What methods were used to conduct the research? Consider sample size, experimental design, data collection methods, and any controls.
- **Results:** What were the key findings of the study? Summarize the results briefly.
- **Conclusions:** What conclusions did the authors draw from their results?
- ***Strengths and weaknesses:*** What are the strengths and weaknesses of each paper? Consider aspects such as sample size, methodological rigor, potential biases, and the validity of the conclusions.

B. Compare and contrast:

- **Differences in methodology:** How do the methodologies differ between the two studies? How might these differences affect the results and conclusions?
- **Contradictory results:** What are the key points of contradiction between the results and conclusions of the two papers?
- **Evaluation of evidence:** Evaluate the evidence presented in each paper. Which paper do you find more convincing and why? Consider the reliability and validity of the data and the soundness of the arguments presented.
- **Bias and limitations:** Are there any apparent biases or limitations in either paper that could affect the results? Discuss any potential conflicts of interest, funding sources, or other factors that could introduce bias.

Learn how to engage in critical thinking: Tips and Hints

Comparing two scientific papers that present contradictory conclusions on the same topic

Title	Authors (1st and last)	Keywords	Methods	Main results	Conclusions	Key figures	Others comments

Any questions ? Or Thoughts ?