HyGate – Hydrophobic Gating in nanochannels: understanding single channel mechanisms for designing better nanoscale sensors

Sapienza Università di Roma
Dipartimento di Ingegneria Meccanica e Aerospaziale

European Research Council
Established by the European Commission

Sapienza Università di Roma

Who am I

Nanoscale Fluid Dynamics

- 2019 Associate Professor at Sapienza, Dept. of Mechanical and **Aerospace** Eng.
- 2013 Max Planck Institute for Intelligent Systems — Stuttgart
- 2014 PhD in Theoretical and Applied Mechanics
- 2011 Double degree in Mechanical Engineering — Sapienza and NYU

Grants and funding (PI)

- 2020 FARE
- 2018 ERC StG grant HyGate
- 2017 PRIN
- 2015-2021 PRACE
- (ERC AdG Casciola)

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European Research Council (ERC) Funding Opportunities

- **ERC Advanced Grant**
  - No age limits
  - 2.5 M€ / 5 years
- **ERC Consolidator Grant**
  - 7-12 years
  - 2 M€ / 5 years
- **ERC Starting Grant**
  - 2-7 years
  - 1.5 M€ / 5 years
- ***ERC Synergy***
  - *2-4 teams*
  - *10 M€ / 6 years*

Common features

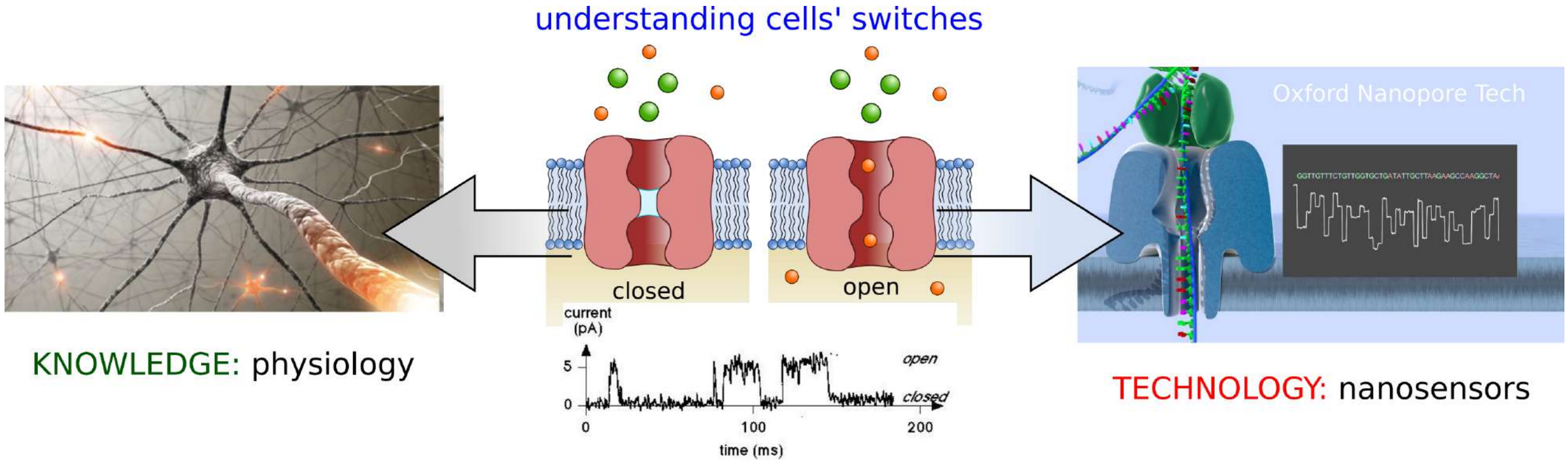
- Personal
- Portable
- Prestigious
- Research-oriented

European Research Council

Established by the European Commission

FET (Future and Emerging Technologies) Open schemes

Example: a nanofluidic project in PE8

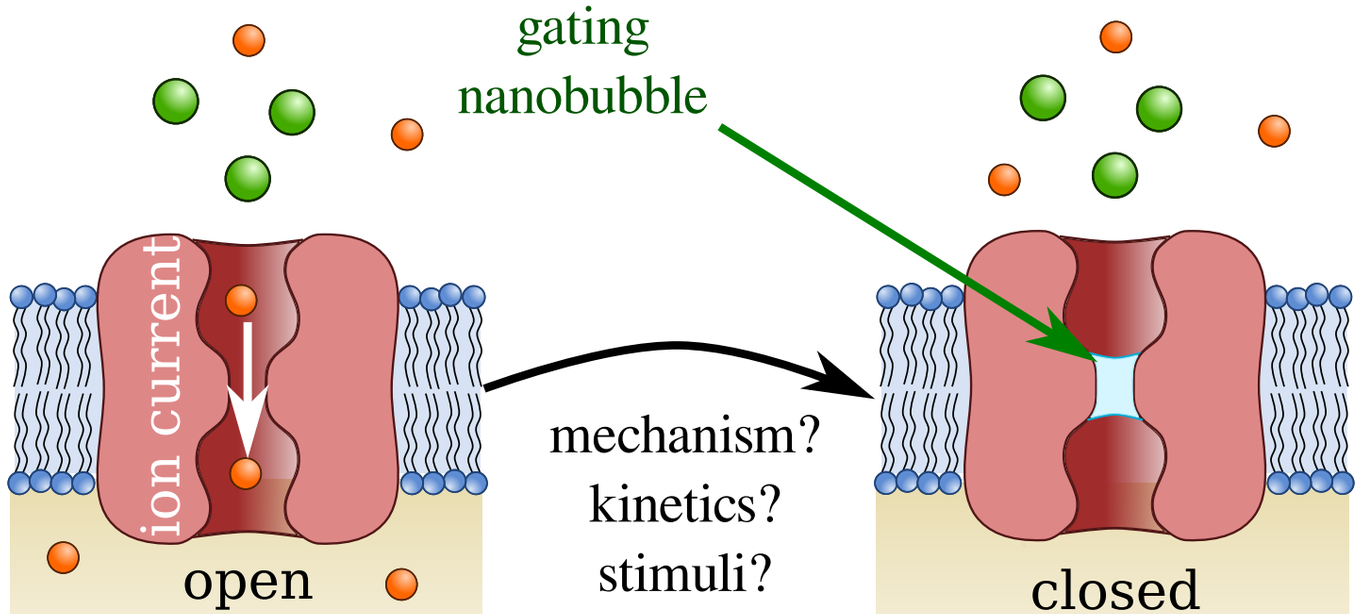


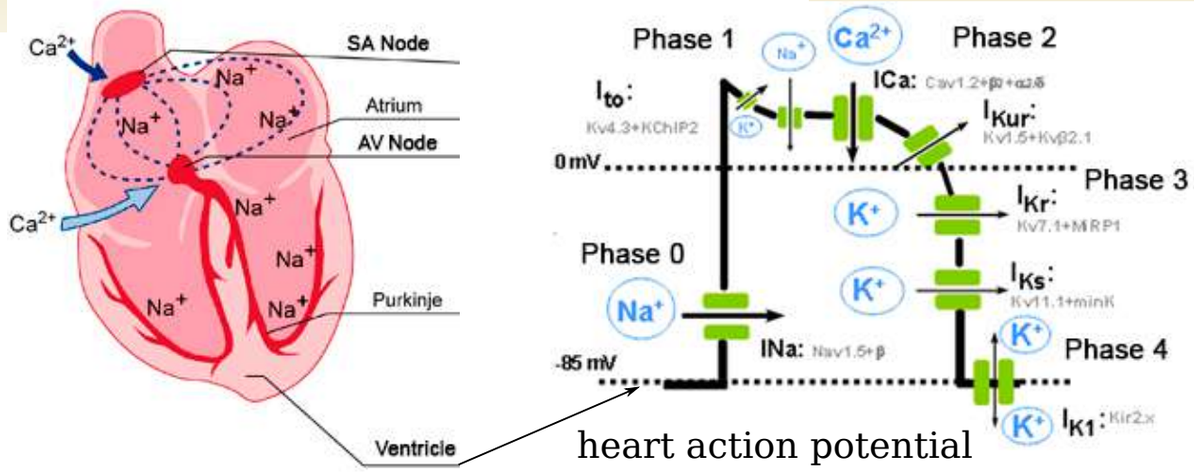
KNOWLEDGE: physiology

TECHNOLOGY: nanosensors

HyGate: Hydrophobic Gating in nanochannels: understanding single channel mechanisms for designing better nanoscale sensors

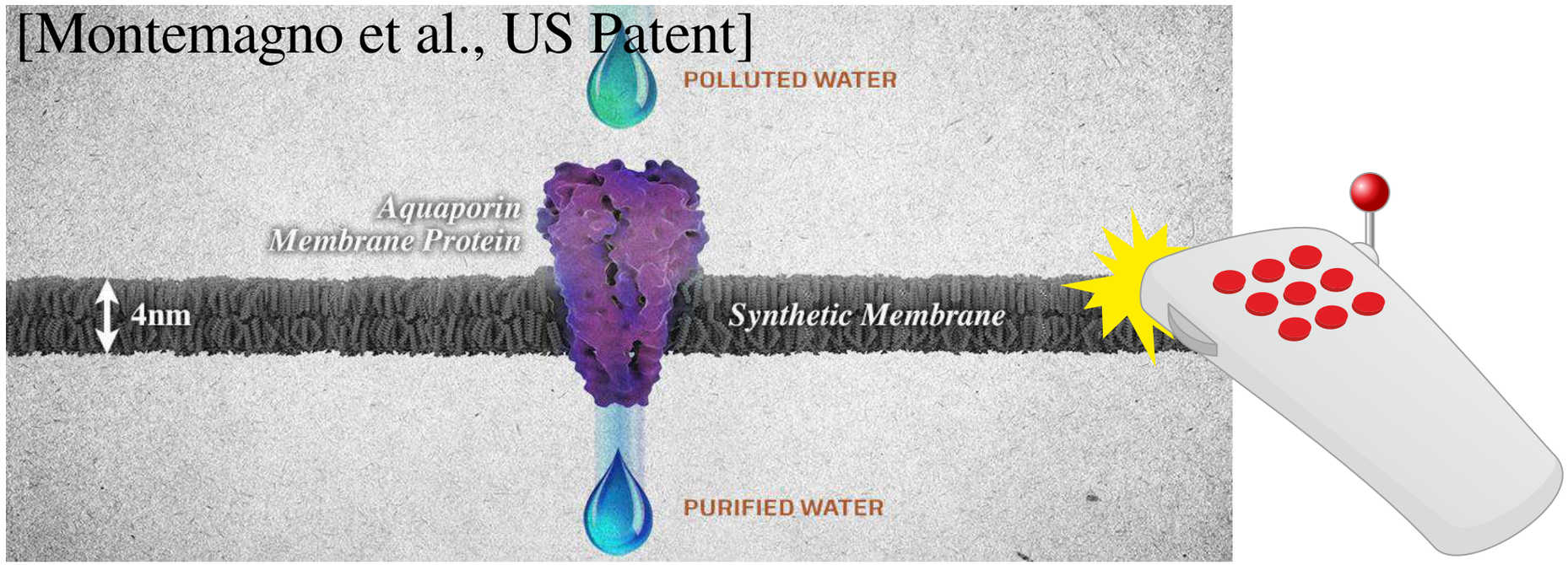
Bioinspiration (significance and impact)





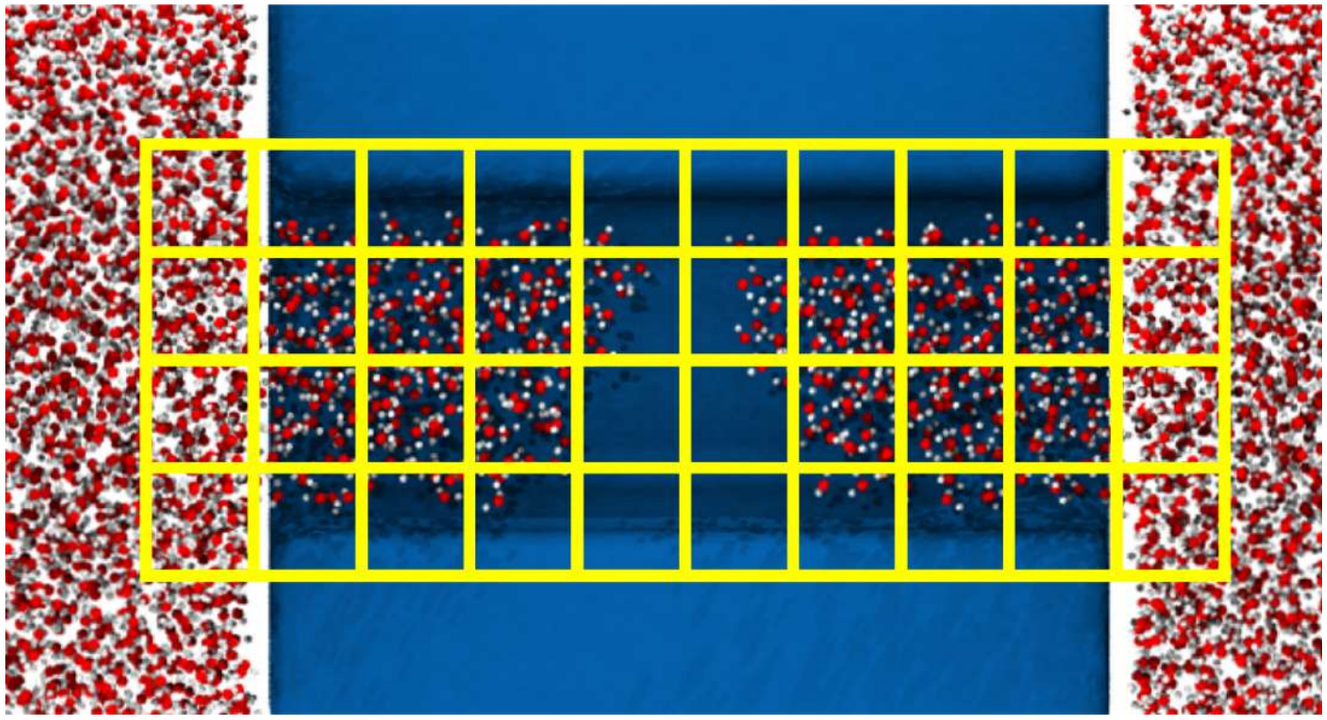
ERC opportunities

Engineering goal (breakthrough & panel selection)



- design controllable nanovalves
- robust, ion-selective, stimuli-responsive
- smart membranes, biosensors, nanoreactor

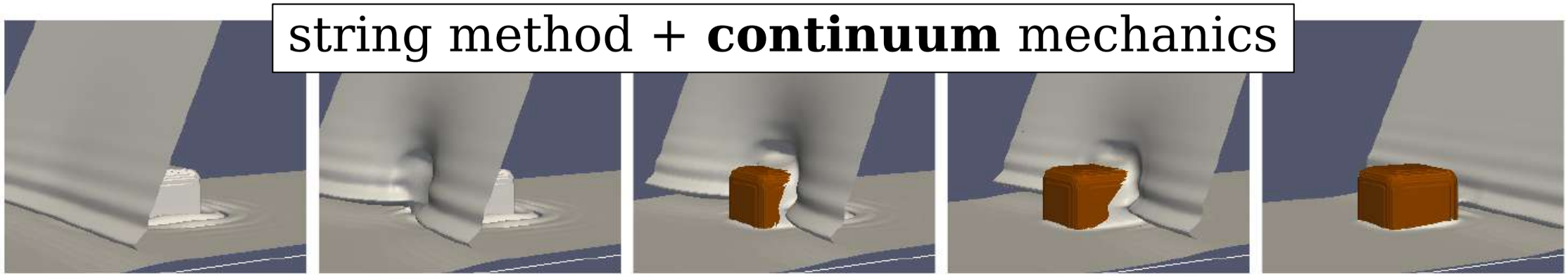
Simulation tools (novelty & individual contribution)



string method in
collective variable
+ **molecular dynamics**

[Giacomello & cowork., PNAS 2017]

string method + **continuum** mechanics



[Giacomello et al., PNAS 2016]

The research group

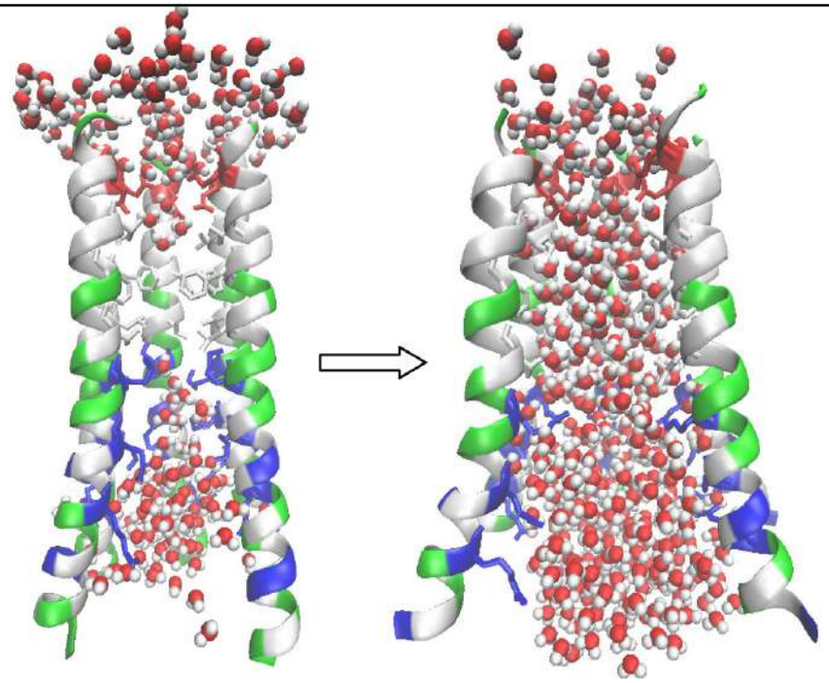


nanoCAFE

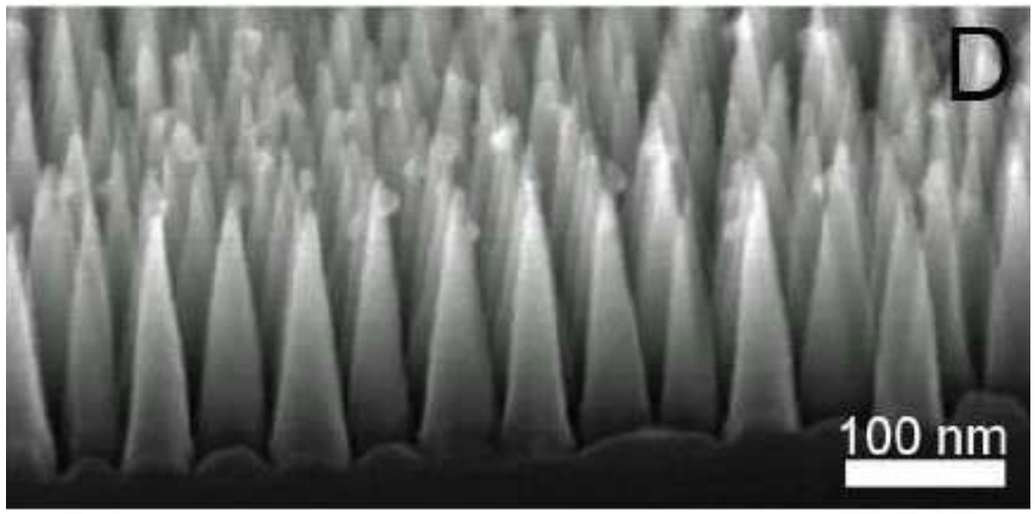
Computational Atomistic Fluid-dynamics & Engineering

https://sites.google.com/uniroma1.it/nanocafe

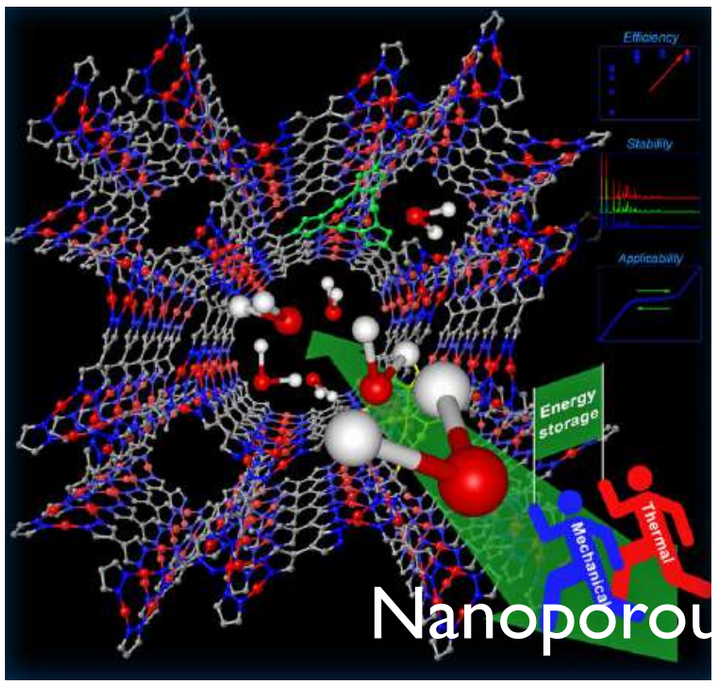
Research lines: nanoscale fluid mechanics



Gating of ion channels



Superhydrophobic sur



Nanoporou



General anaesthetics

Tips for writing an ERC proposal

The proposal

- ☑ High risk — high gain (managed risk)
- ☑ Groundbreaking, non-incremental
- ☑ Ambitious but credible
- ☑ Multidisciplinary but NOT cross-panel!



Principal Investigator

- ☑ Intellectual capacity
- ☑ Creativity
- ☑ Commitment
- ☑ Only the PI can do it!



My experience

- **Part B1: proposal overview, INTRIGUE**
  - 3-4 **panel** members
  - 5-page proposal
  - 2-page CV
  - 2-page Early Achievement Track Record
  - OUTCOME: A, **B, or C**
- **Part B2: detailed proposal, CONVINCE**
  - 2-7 external specialists
  - 15 pages
  - OUTCOME: A or B
- ***Interview***
  - *15 panel members*
  - *PE8: 5 min presentation, 3 slides*
  - *25 minutes question time w panelists*
- **Negotiation**

Proposal timeline

- Previous participation to ERC-AdG Casciola
- Proposal writing ~6months (October 2017)
- First evaluation passed (March 2018)
- Interview (June 2018)
- Final results (July 2018)
- Negotiation
- Project start (February 2019)

Career impact

- **Chiamata diretta PA**
- FARE grant
- SSAS junior fellow
- PhD board

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Example: CV + Early Achievement Track Record

Publications

- 5 art. for EATR
- **>1 w/o PhD supervisor!**
- **Independence**: time abroad

Grants/Awards

- PRACE grant
- AIMETA Junior Prize
- Proposal writing

Invited Talks/Intl. Collaborations

- Describe your internatl. network
- Highlight your role

TIPS

- Bibliometrics PE8 - StG2012: 36 pub. / 300 cit. / 8 H-ind.
- Write 5-lines research statement
- Show your independence
- Show your unique contribution(s)

Give it a try!



SELF-EVALUATION

- Summarize your idea in 2000 words
- Define your unique contribution
- Write your research highlights in 5 lines

OTHER TIPS

- Right timing: What call?
- How can I improve my profile?
- Preliminary data to support new idea
- Familiarize with the ERC parlance

ASK, ASK, ASK!

CALL CALENDAR 2021

TENTATIVE DATES

Starting Grants | ERC-2021-StG
Open: tbc
Deadline: 24-03-2021 (tbc)

Consolidator Grants | ERC-2021-CoG
Open: tbc
Deadline: 20-04-2021 (tbc)

Advanced Grants | ERC-2021-AdG
Open: tbc
Deadline: 31-08-2021 (tbc)

Please note that the dates are subject to the adoption of Horizon Europe and the ERC Work Programme 2021

05-02-2021
ERC hopes to launch first Horizon Europe calls at the end of February

26-01-2021
2021 Work Programme and First Calls

ERC FUNDING EXPLAINED

Watch our instructional videos

Bottom line

Have fun with your proposal!