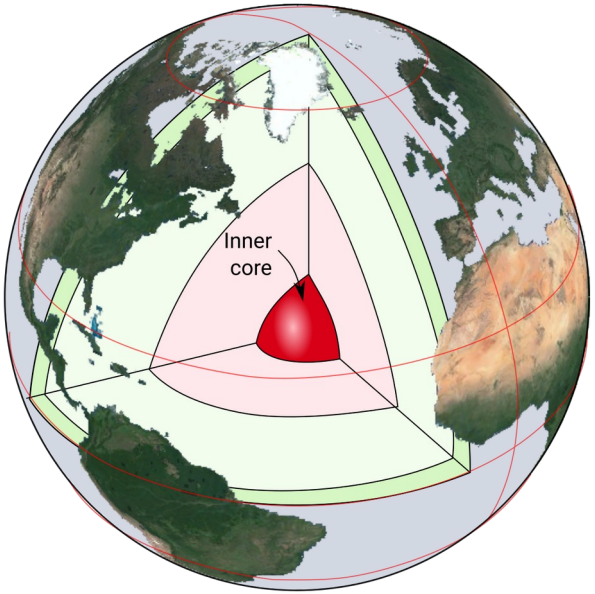


ERC Session
European Conference for Aerospace Sciences
Lille, France, June 2022

Sébastien Merkel

Université de Lille, France

About Me

CV

- 1999 – 2002: PhD in Lyon / Washington DC
- 2002 – 2006: Post-docs in Japan and the United States
- 2006 – 2010: CNRS Research Scientist
- 2010 – now: Full Professor at Univ Lille
- 2014 – 2019: Junior Member, Institut Universitaire de France
- 2022: ERC Advanced Grant Recipient (PE10 Earth System Science)

Research topics

- High pressure / high temperature experiments
- Mineral physics / materials plasticity
- Deep Earth Geophysics
- Interior of the Earth and other Earth's like planets

My History with ERC Applications

~ 2011: first application to ERC Consolidator Grant
- Admitted to phase 2 for interview in Brussels
- Proposal not funded

~ 2012: second application
- Admitted to phase 2 for interview in Brussels
- Proposal not funded

….. Low tide ….

2014 – 2019: Junior Member, Institut Universitaire de France

2018 – 2022: French German ANR – DFG Grant

…. ….

2021: application for ERC Advanced Grant
- Admitted to phase 2 for online interview
- Proposal funded in April 2022

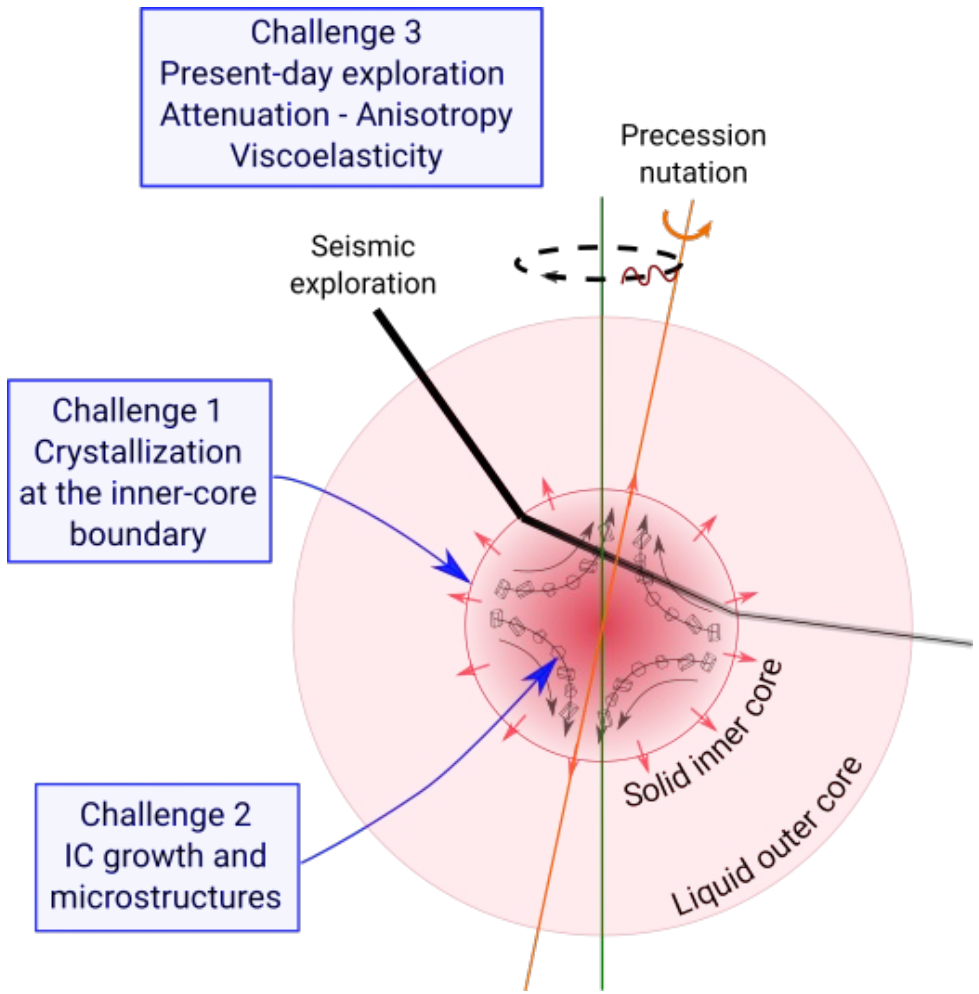
“HotCores” project

Broader impact

- Thermal history of the Earth
- Earth magnetic field
- Cores of Earth-like planets

“HotCores”

- Integrated experiments on metals at high T
- Groundbreaking data for
  - Multi-scale models of inner core structure
  - Interpretation of geophysical observations
- Elucidate past and future growth of the inner-core



Team
PI (28 p.m), CNRS researcher (7 p.m.) engineer (20 p.m.)
5 years post-doc, 3 PhD students paid by ERC
590 k€ of equipment

Why an ERC?

Among others...

- 5 years guaranteed funding for a large scale project
- Timing was right
  - ANR-DFG grant was finishing
  - I had time to think about what I wanted to do
  - I had preliminary data
  - I was 100% available to commit to a new project
  - I was ready to fail and go through 1 or 2 years with no funding. I did not care.

Things I should not say

- Prestige
- I had to (political pressure, university pressure, peer pressure)

Keys to Success (?)

N. 1: **a good research project**

N. 2: **a good research project**

N. 3: **a good research project**

N. 4: **time**

N. 5: **time**

N. 6: **a good track record (Advanced Grant)**

- ***Publications***. Not especially high profile, but recognized publications in the field (I had some *Science* papers many years ago, but not recently)
- ***Recognition***. Recognition of your international stature (for me: elected as a council member for the American Geophysical Union, review panels for European Synchrotron Sources).
- ***Experience***. Demonstrated experience in running a large project (ex: ANR-DFG)
- ***Impact on others***. Training of or interactions with of new leaders in the field. Former students endeavor (not especially in academia).

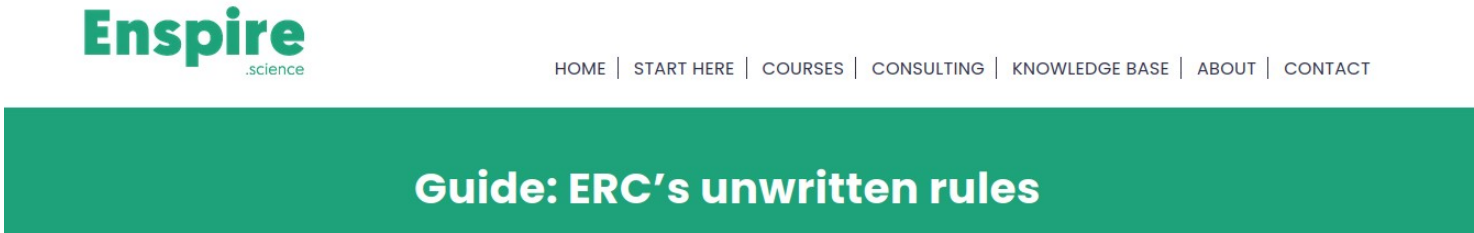
Things to Keep in Mind

ERC project should be

- Focused on ***1 person***, the PI, not a group
- Hypothesis driven: ***1 key question***, research hypotheses, means to assess them
- High risk / high gain: ***disruptive***, ***ambitious***, unique, impact beyond your field
- Open-ended: ***opening a research field*** rather that closing a research question
- Non-incremental: ***new questions***, new hypotheses, new methods
- Non-fragmented: ***1 question***, a several hypotheses to address ***the*** question

ERC projects are not

- A collection of smaller projects
- An opportunity to fund your lab and collaborators
- A large ANR project



My Own Timing

Several years of maturation

- Writing down ideas, anytime, at home, at work, at conferences
- Recording relevant publications
- Listing out projects I could do
- Preparing for potential collaborations: contacting people, inviting them for seminars, launch small projects, exchange students, etc

2 years prior to deadline

- ERC generator funding from I-SITE ULNE: some funding, ***reduction of teaching load***, travel for ideas and collaborations (but it was 2020…)
- Start combining all ideas and small projects into 1 single major question

6 months prior to deadline

- Get in touch with support office at the University
- Said “No” “No” “No” to everything else
- Hide from any form of local responsibilities

Written Project: My Own Timing

My deadline was August 31st

March: got in touch with University support service. Set up regular meetings to keep the pace

April – May: wrote a first draft for B1: extended synopsis (5 pages) and PI track record

June: sent B1 draft to 5 key people

- 2 experts from the field
- 1 former panel member
- 1 science-aware non-researcher (program manager in Denmark)
- 1 scientist outside of my own field

Mid-June – mid August: wrote B2 based on comments on B1 (***this was way too short!***)

Mid-August: completely rewrote B1

No time for proofreading. 1 single person read B2. I was very short on time...

Feedback on B1

Experts

- Some technical issues
- Good advice for improvement and how to be more convincing

Non-experts

- Found it too technical and fragmented
- Could not see the main question nor the potential for breakthrough
- Asked for clarification at many points

Former panel member

- Technical issues with the science project
- Identified missing items:
  - Synopsis is 5 pages, but references are not limited! You should prove that you know the field, perfectly. My last version for B1 had 95 references.
  - I was missing a “risk assessment” section → very important
  - Missing or unclear elements in the way I presented my track record: bibliometric information, supervision, impact on the field

No time to really proofread my B2 → big mistake

But

- I had been thinking of the project for years
- I had preliminary data
- I had preliminary publications
- I cited 163 references
- I tried to be as clear, as sharp, and as efficient as possible
- The document was clear, with spaces, figures, and easy on the eye

Other elements

- I did not use external consultants
- I focused on the science
- I had some budgeting elements but not described in the finest details
- I had some timing elements but not described in the finest details
- I worked hard on the “risk assessment” section
- I did not forget the “broader impact” section

Oral Interview

Got notified end of November

Early December:

- Interview end of February: 3 min presentation + 20 minutes questions
- Had no time
- Was afraid of questions from my previous experiences → sought help from professional consultants, ~1500€ each

January – February

- Every Monday afternoon dedicated to interview preparation
- Sometimes Wednesday as well
- 4 support groups (each was called 2 or 3 times)
  - University support team
  - 5 or 6 lab members, not all from the field
  - 5 or 6 external members, who I knew and trusted, with various expertise
  - 2 professional consultants

Some Elements for Oral Interview

Remote presentation

- Need to test the software (webex)
- Prepare a dedicated workspace: standing up (do not sit), lights, simple background, large screen to see the panel members and their names
- No information on panel (apart from chair): as webex starts, you have 15 faces in front of you, and you need to figure out who they can be

Questions

- All science questions
- Many from experts who evaluated the project
- Many from various panel members

Panel is diverse

- Important to train on how to answer questions efficiently, with simple words, but keeping the scientific content

External Consultants?

Writing

- Goods
  - Consultants are good to push you out of your zone of comfort
  - Regular meetings with consultants will force you to keep a timeline
  - If your written English is poor, they can help
- Bads
  - ERC is 100% science based → be careful with their advises
  - Stick to the science: you are the one who knows

Oral interview

- Excellent input from one, ok input from the other
- Helped me prepare to answer tough questions, efficiently
  - Could you tell us a little bit about yourself?
  - Isn't this project incremental?
  - What is the innovative nature of the project?
- Training for general questions, in front of non scientist, helped training on answering technical questions and be understood by the full panel

Final Thoughts

Timing is key

- Allow time to think about a good project (could be several years)
- Allow time to write up → 50% of your time for 8 months
- Say no to everything else
- You need to be available, with yourself, with your time, with you head

Relax and protect yourself

- Avoid peer (and administrative) pressure
  - Very few people knew I was writing this up
  - Very few people knew I was taking an interview
- Be ready to fail
  - I had data from previous projects
  - I was willing to go through a couple of dry years, I did not care

Have a good project

- Do not send a the last minute draft thinking you will improve it later
- You won't. Writing an ERC takes time and you will get tired of it
- Very difficult to improve a written project
- Timing can very short between rejection and resubmission → no time to improve

Things that helped me

Being a council member for the American Geophysical Union for 4 years

- Met leaders in the broader field
- Had a bird-eye view on the research field
- Gained experience with discussions of strategy, thinking outside of your comfort zone

Time

- I took several years to prepare my ideas before writing
- I dedicated ~6 months to writing
- I allocated significant amount of time for the interview preparation

Experience

- I failed 10 years and knew my weaknesses (fragmented project, not trying to answer a single question, did not allocate enough time to prepare)
- I spoke with many people who had an ERC to have a clue on how they prepared and organized their projects