# ENS – IISER Network / BIOSANTEXC Project

## Internship Proposal Form
## France to India

**(Discipline/Field name)**

Astrobiology/Origins of Life

**Internship title:** Abiogenic emergence of life-like moieties during life's origin.

Keywords related with the subject (minimum 3): Astrobiology, prebiotic chemistry, Synthetic life biology

**Name of the IISER: IISER Pune**

**Name of the laboratory(ies): The Chemical Origins of Life (COoL) lab**

**Name of the internship supervisor(s): Sudha Rajamani**

**Email(s):** srajaman@iiserpune.ac.in

**Prerequisites for the internship:** Background in biochemistry/molecular biology/biophysics/organic chemistry will be very desirable.

**Requested level:** M1/M2/Gap year students

**Foreseen internship dates:** Feb 2025 and after

**Internship type (refer to page 1)**:
♦ 3-6-month internship ♦ Research stays

**For 3 to 6 months internships, please indicate the desired duration: 3-6 months (©)**

**Internship proposal (description and expected training outcomes / half page min, 1 page max):**

At the COoL lab at IISER Pune, we are interested in understanding how life would have originated on Earth; a question that continues to be one of the greatest scientific mysteries. Specifically, we are interested in characterizing the processes relevant to the emergence of informational and catalytic polymers, and the earliest compartments. The aforementioned two processes have fundamental implications for understanding how chemistry would have transitioned to biology on the early Earth. Our work involves projects like: a) Characterizing primitive informational molecules of pre-RNA and RNA Worlds b) Nonenzymatic oligomerization of nucleotides and related molecules, and their

replication to understand how molecules of these aforesaid worlds would have emerged and propagated and, c) Characterizing protocellular systems using prebiotically pertinent amphiphiles to discern robust compartments that could have formed minimal life like entities. And more!
We evaluate the aforementioned phenomena in, both, laboratory-simulated and early Earth analog conditions as physicochemical constraints of the immediate environment would have shaped the emergence and evolution of early cellular life.

**Training**: Since we use a diverse set of tools from a few different areas of sciences to answer the aforesaid questions, incoming trainees can expect to learn diverse techniques that we use (check this link for some idea reg. this: https://www.sudharajamani.com/publications). Importantly, they will leave with an appreciation for how life could have come about on the early Earth (~ 4 billion years ago) and what implications that the understanding we glean from our work have for habitability related aspects.

**Internship conditions:**

- hostel accommodation (subject to availability)
- stipend towards living costs on campus