prbb intervals
Continuing Professional Development Programme
Space for Reflective Learning

PRBB Intervals Course Proposal

Course Title
Night Science Workshop on the Creative Scientific Process

Proposed date(s)
June 10 2026

Course Language
English

Course Leader(s) and very brief summary of relevant qualifications and experience (no more than 2 lines for each trainer)
Martin Lercher, PhD, Professor at Heinrich Heine University Düsseldorf, where he combines physics, deep learning, and genomics to develop mechanistic models of biological systems. He co-authored *The Society of Genes* and co-founded the Night Science Institute to advance the teaching of scientific creativity.

Rationale for course (why is this course of interest for the PRBB staff?)
Scientific progress and discovery depend on two distinct but essential modes of thinking: the structured, logical realm of "Day Science" and the creative, intuitive realm of "Night Science." Success in research requires the ability to navigate the interplay between these two modes, yet the creative side is often less formalized. The workshop exists to bridge this gap, addressing how science actually works by explicitly focusing on the creative and exploratory aspects of the scientific process.

Course aim – general
- To provide a framework for integrating creativity, collaboration, and rigorous testing in research.
- To encourage reflection on personal scientific thinking and collaboration styles.
- To foster a supportive environment that encourages risk-taking, vulnerability, and interdisciplinary approaches.
- To complement existing training in research design by offering tools for individual reflection and collaborative ideation.

Specific learning outcomes - What new i) knowledge, ii) skills & iii) attitudes will participants take away from the course?
By the end of the workshop, participants will be able to:
- Distinguish between modes: Identify the differences between Day Science (falsification-driven) and Night Science (associative/intuitive) and understand the necessity of moving between them.
- Use "code-switching": Recognize when to use precise, formal language versus metaphorical, anthropomorphic language to aid ideation.
- Enhance collaboration: Apply improvisational techniques (such as the "Yes, and..." rule) to foster better one-on-one discussions and group dynamics.
- Refine research questions: Demonstrate the ability to reframe broad questions into specific, provocative ones to drive breakthroughs.

- Navigate data exploration: Balance data exploration with hypothesis testing while recognizing the risks of confirmation bias.
- Categorize problems: Classify scientific challenges into different "puzzle classes" (e.g., jigsaw, connection riddles) to spark new problem-solving approaches.
- Apply meta-cognition: Engage in "puzzle switching" and think beyond disciplinary boundaries to drive innovation.

Course contents (outline of topics to be covered)
See document below.

Training methods
In person workshop with didactic elements and interactive exercises as well as discussion throughout.

Target group in PRBB (Senior scientists, postdocs, predocs, management/admin staff, all residents)
Researchers and research support staff

Number of participants (maximum)
15 participants

Total course hours (Please specify: direct training with instructor present and required self-study)
Note: only the direct training hours will be included in the post-course certificate.

Number of hours of class time: 8 – one day workshop with trainer present
Number of hours of self-study: 0
Total number of course hours: 8

Distribution of course (hours/days)
8 hours/ 1 day

Pre-course preparation and self-study expected between sessions (what preparation should participants do before the course and/or in between sessions – reading, online study, prepare ideas etc?)
None expected – recommended: listen to a few episodes of the Night Science Podcast, and read some of the material at www.-night-science.org – learn then read.

Material participants need to bring (laptops, etc…)
Something to write a few notes on – pad, phone, computer.

Relevant background reading/ audiovisual/websites or other materials
www.night-science.org – learn tab: read for editorials, listen for podcast

The Night Science Workshop

Workshop Overview

The scientific method tells us what to do once we have a hypothesis – but where do these hypotheses come from in the first place? Francois Jacob famously called this part the realm of **Night Science**.

The workshop teaches the dichotomy of the scientific process, which consists of both Day Science, the rigorous testing of ideas with empirical data, and Night Science, the creative scientific process. It introduces a set of thinking tools:

Improvisational science and it takes two to think:
Borrowing concepts from improvisational theater – including the "yes, and" rule – we discuss the mechanics of 'talking science' and explore the creative powers unlocked through discussing ideas with colleagues, highlighting the roles of encouragement and a suspension of criticism.

The two languages of science:
Science reporting is precise; but the language of discovery is different, it thrives on analogies, metaphors, and anthropomorphisms, which exploit intuitive powers that human brains evolved in response to social interactions. We discuss and exercise the intentional stance, the role of metaphors in reasoning, and translating between the two languages of 'Day Science' and 'Night Science'.

What is the question:
A discovery is unexpected – an unknown unknown – and often does not fit neatly into a 'knowledge gap'. A crucial step in many discoveries is the invention or the refocusing of a scientific question, and we explore ways in which questions may be formulated or rephrased to facilitate scientific progress.

The data-hypothesis conversation:
The creative process thrives on an attitude that encourages exploration and speculation. Science relies on a back and forth between data and ideas, and the two corresponding modes of investigation overcome each other's limitations.

Contradictions and Perseverance:
Contradictions are often perceived as nuisances; but embracing them counteracts our natural human tendency for confirmation bias, opening the door to new insights and predictions that can profoundly alter the course of a project.

Interdisciplinarity & Renaissance minds:
Disciplines and fields are historical constructions, representing just one way of clustering knowledge. We explore the 'expert's dilemma' between disciplinary day science expertise and interdisciplinary Night Science creativity, which often involves the import or export of ideas and technologies between fields.

Science as a meta-puzzle:
Science is puzzle-solving. We describe a system for classifying puzzles, appropriate both for human-made puzzles and for scientific projects. But nature's puzzles are different from artificial puzzles in one crucial aspect: in an ongoing research project, you can never be sure what kind of a puzzle you are in. We discuss how conscious 'puzzle-switching' boosts our scientific creativity.

Openness guides discovery:
Scientific research is often expected to follow a structured, linear plan, but in reality, it evolves unpredictably. We discuss and practice how openness to experience is crucial for scientific creativity. Engaging with diverse perspectives and collaborating with colleagues enhances idea generation.

Getting creative with AI:
Can AI make us more creative? We'll explore how it can act as a collaborator, sparking new ideas, challenging assumptions, and pushing the boundaries of scientific thinking.