Course Catalog

2018/2019

FdV
LIFE SCIENCES

—

FAN
LEARNING AND DIGITAL SCIENCES

Catalysing a fruitful future

CRI

FIRE Doctoral School Courses

FIRE doctoral school offers a number of technical and transversal courses, given entirely in English. A limited number of students is accepted for each course and priority is given to FIRE students, but PhD students external to the doctoral school are accepted upon availability.

In order to register to these courses or in case further information is needed, please contact the scientific coordinator of the doctoral school, Eugenia Covernton, via email to **eugenia.covernton@cri-paris.org.**

FIRE offers a number of technical, teaching, and transversal skills courses. Please note that this list might grow during the academic year, the updated list of courses is available at https://cri-paris.org/fire

TECHNICAL AND TEACHING COURSES

LIFE SCIENCE OF NARUTO?!

INSTRUCTOR Stephane Douady
CONTACT stephane.douady@univ-paris-diderot.fr
ORGANIZATION Tuesday evenings in October and November

// OBJECTIVE //

Apart from having the pleasure to (re)discover Naruto, or to discover at least what everybody around you know and you don't, the aim of this module is to use this Manga series to discuss:

• The deep significance that we can find in the story and behaviors shown. This part is mostly about cognitive/neurosciences and psychology. It shows how we can describe the functioning of our brain, from very clear and detailed examples.
• The analogies that can be drawn from some aspect of Naruto's world, or how they can be related to "common" biological theories. The idea is to reveal them and then to discuss and challenge them.

Each session will begin with a viewing of an episode or parts of episodes of Naruto and will continue with a discussion around the theme of the day. The discussion can then go on about the meaning of analogies, their significance and importance, usefulness. Some possible themes include:

• Naruto and cognitive sciences: perception and interpretation (with illusions and their mastering), communication and language (and what is actually communicated) and an original (involuntary?) representation of the unconscious brain.
• Naruto and psychology: individual freedom, predetermination, social interactions, resilience...
• Naruto and Biology: notion of life (vital fluid? what is alive? dead?) the individual, the notion of species, trans-species and bifurcating ones and an (involuntary) and original representation of DNA encoding

ONE WEEK IMMERSION INTO PYTHON PROGRAMMING FOR SCIENTISTS

INSTRUCTOR Antoine Angot
CONTACT antoine@leaneous.com
ORGANIZATION January 21st to 27th

// OBJECTIVE //

The aim of the course is to provide an intensive introduction to Computer Programming using the Python programming language.

This course will cover basics to advanced programming skills that you'll learn almost exclusively solving problems and exercises of a daily-based progressive difficulty. While this course is both adequate for people without any prior experience in programming, and to those having already programmed but who are willing to get better.

During the weekday sessions students will be presented with numerous exercises with a level of difficulty spanning from very easy to very hard. The idea is that anyone can start doing the exercises and struggle at the point of difficulty that will make him/her improve his/her understanding and abilities to code. During the weekend sessions, students will team up to realize a project. They will be given a choice between several projects involving scientific computing, web, network, etc. This will be an opportunity to realize a full program and to discover libraries (i.e..existing code) adapted to their area of expertise.

INTRODUCTION TO MACHINE LEARNING

INSTRUCTOR Yann Le Cunff
CONTACT yann.lecunff@gmail.com
ORGANIZATION May 22nd to 24th

As biology is becoming more and more quantitative, today's scientists end up with a huge amount of numbers to describe their experiments / their empirical observations. Traditional approaches, based on p-values and hypothesis testing, are very often pushed beyond their capabilities in these cases. In this 3 days workshop, we will cover the basics of machine learning (ML), namely how to extract information from datasets that could not be analyzed with the naked eye or manually. The aim is to share both the underlying mathematics (in a gentle way !) as well as provide a practical use of the methods, through dedicated softwares. Students are more than welcome to come with their own datasets and/or share the ML methods they could have been already using. In that sense, the proposed schedule is only an outline and many of its parts could be covered by one or more willing participant. In the same spirit, if a specific method is of interest for a good number of people, it can be added in the program.

CELL MODELING

INSTRUCTOR Vincent Danos and Guillaume Terradot
CONTACT vincent.danos@gmail.com and guillaume.terradot@symbiose6.fr
ORGANIZATION January 28th to 31st

// OBJECTIVE //

In this course students will learn about and implement a physiological model of a cell then propose their own improvements and additions inspired by their research interests.

// DESCRIPTION //

A large amount of work has been devoted to the mathematical and computational modeling of specific cellular processes. As accurate as these models may be, their isolation from the physiological cellular context hampers the study of the role they can play in global cellular behaviors. A whole cell model is an aggregate of mathematical representations of cellular subprocesses (e.g. translation, protein maturation, etc.) [see an example of a whole cell model]. Of course, such sub models need to be validated against experimental data. Eventually, we expect the aggregate model to explain high level behaviors of a cell like the growth rate. During this hands-on workshop, such a model will be realized.

INTRODUCTION TO OPTICAL IMAGING AND IMAGE ANALYSIS

INSTRUCTOR Bassam Hajj
CONTACT bassam.hajj@curie.fr
ORGANIZATION February 14th -15th and 22nd

Optical microscopy is one of the most useful tools in life science studies. This course aims to introduce the different optical microscopy modalities. The course begins with basics in optics and image formation, then steps through the different contrast mechanism before detailing the latest advances super-resolution microscopy. The goal is to familiarize students with the different approaches in order to correctly identify the best technique to investigate their biological question. A second part of the course is dedicated to image handling and analysis using the widespread imageJ software. It includes a hands-on session with real data examples. The course will cover the following:

LIGHT MICROSCOPY

- Basics in optics: lens and image formation
- How does a microscope work?
- Noise: origins and characteristics
- Contrast modalities in microscopy: transmission, phase contrast, fluorescence, other contrast mechanisms
- Imaging in 3D problems and solutions: confocal imaging, light sheet excitation, multiplane imaging
- Super-resolution methods: insights into single molecule localization techniques: fluorofores, excitation power, localization.
- Localizing molecules in 3D: challenges and the different available solutions
- How to choose the best technique to treat your biological question: pros and cons of each

PRINCIPLES OF FLUORESCENCE SPECTROSCOPY - APPLICATION TO LIFE SCIENCES

INSTRUCTORS João Miguel Freire
CONTACT joaofreire.peu@gmail.com
ORGANIZATION March 14th - 15th

// OBJECTIVE //

Radiation phenomena allow us to experience amazing things in life. The blue sky, the sunset, or the rainbow during a soft rain are all result of interactions between light and matter.

In Life sciences, spectroscopy techniques allow us to quantify, visualize and monitor in vivo how our system behaves. Among the possible tools, Fluorescence spectroscopy is one of the most widely used. It can be applied for quantitative colorimetric analysis and/or to label and detect organelles in a virus, bacteria, eukaryotic cell, tissue or even a living organism, among other possibilities. To reach these possibilities, the discovery of fluorescence proteins, as well as the development of bright artificial probes and chemical reactions that would allow site-specific labelling of our desired target, have contributed extensively.

This course will address the fundamentals of Fluorescence spectroscopy, explore the various applications (quantitative and qualitative) that it may be used for and allow the students to get familiar with several techniques that use Fluorescence spectroscopy. It will allow them to pose their questions and address which technique and approach would be the best option to answer their biological question.

// COURSE OUTLINE //

• Principles of Fluorescence spectroscopy (Steady state and life-time)
• Sources of Fluorescence in life sciences (natural fluorescence, fluorescence proteins, artificial probes)
• Fluorescence spectroscopy in life sciences (Toxicity, SNR, multicolor)
• Quantitative techniques using Fluorescence spectroscopy
- Partititon, Quenching, FRET
- Co-locallization, FLIM
- Live imaging and quantitative kinetics
- FRAP
- ICS, STICS
- Single molecule techniques (FCS, FCCS and RICS)
- Photoactivation techniques - Superresolution techniques (PALM/STORM)
- Flow Cytometry and kinetics
- Anysotropy

BASIC PRINCIPLES OF CANCER CELL BIOLOGY

INSTRUCTORS David Silvestre
CONTACT davidcsilvestre@gmail.com
ORGANIZATION April 4th-5th

// OBJECTIVE //

Cancer as a phenomenon is at the crossroad of most (if not all) basic cellular processes: cell signaling, motility, gene transcription, DNA repair…Indeed, many of the fundamental mechanisms taking place in normal cells have been identified due to their dysregulation in cancer cells. This course will focus on the molecular and cellular origins of cancer, the consequences of cellular transformation at the level of organs and in the potential use of abnormal function as a target to treat the disease, according to the models of translational research and precision medicine. In particular, we will study the past and current trends on the field of drug discovery

in oncology, as well as their efficient and safe delivery, discussing strengths and weaknesses. Throughout discussions, we will identify and discuss the main opportunities and challenges in basic and applied cancer cell biology, on the aim to propose new and unexpected potential clinical strategies.

// COURSE OUTLINE //

The main topics of this course will be:

• Cancer cell hallmarks
• Cellular origins of cancer. The Cancer Stem Cell model
• Drug discovery in oncology: target identification and validation strategies
• Delivery technologies to enhance drug safety, specificity and activity
• New fields in cancer cell biology: what's next?

Students should have an undergraduate level knowledge of cellular and molecular biology (e.g "Molecular Biology of the Cell", by Bruce Alberts et al).

DATA-DRIVEN RESEARCH IN SCIENCES

INSTRUCTOR Celya Gruson-Daniel, Constance de Quatrebarbes
CONTACT celya.gruson-daniel@cri-paris.org and 4barbes@gmail.com

// OBJECTIVE //

This course offers an introduction to open and data science combining a pragmatic approach (initiation to programming using python language) with a reflexive perspective.

We will follow the different steps of data processing (from data collection to their visualization). Applied exercises will enable students to learn about programming so as developing a critical thinking of the technical and socio-political stakes undertaking these practices (Science Technologies Studies approach).

The aim of this course is not to train engineers but to give technical autonomy to PhD students with their digital research.
They will be prepared to solve data-driven research projects by expressing their need, contributing to open communities, and working with developers, data scientists, computer engineers, project managers, product owners, etc.

ORGANIZATION The course will be split in two modules, that can be validated separately

Module 1 (January 31st - February 1st): First step into open and data sciences: two days to manage your digital research environment (Digital dip)

These two days will give you a better understanding of your digital research environment and help you to manage your Phd project with open and data science practices.
Step by step, we will open together the «black box» of your computer, take the control of the shell, learn how to structure your working documents and discover free and open source softwares that fits with your needs in terms of open and data sciences. This practical introduction to data-driven research comes with its own context in background. You will be shown critical perspectives on major changes in today's research produced by the digital world (open access, open data, data driven research, digital methods, etc.).
Requirements: No requirements at all. For a fruitfull session, list all technical needs related to your digital research workflow you have faced during your PhD or think you will encounter.

Module 2 (February 4th to 6th): Practicing open and data sciences: initiation in programming and the basics of data-driven research (Digital dive)

After crossing the gate and opening the «black box» of your computer, these three days are designed to let you, in practice discover all the open ingredients to start sucessfully open and data sciences project. Understanding the basics of programming means understanding both how to use it and what it is about (automatisation of algorithmic processes).
You will experiment it by learning at your own pace with simple exercises in Python on a dedicated online learning platform. Moreover, you will learn how to organise your daily research workflow in an open environment (agile methods, free and open source softwares, international and online cooperation, team management, etc.) Along this session, illustrations of open sciences issues, sociopolitical stakes and data sciences challenges - that you might encounter on your research projects - will be given as critical lightning.

Requirements: Validation of the first module or basic understanding of computer organisation, knowledge of daily tasks using the shell, previous installation made during the module 1: python, git, a code editor (Atom, SublimText)

GAMES TO TEACH AND DO RESEARCH

INSTRUCTORS Amodsen Chotia and Raphael Goujet
CONTACT amodsen@cri-paris.org and raphael.goujet@cri-paris.org
ORGANIZATION 2 full days in May

// OBJECTIVE //

The aim of this course is to first assess the potential and the limitations of using games to do research and teach, and secondly for participants to "gamify" their PhD projects.

Recently, a great number of scientific projects were developed around massive online games (Foldit, Galaxy zoo, Picbreeder, Phylo). Also, it is well recognized that learning can be achieved through playing games. In this course, we will review some example related to:

1) the use of games to perform a given research subject,

2) scientific research which can be done with games,

3) games to teach a oriented concept, and

4) knowledge one can get from games.

The objective is to assess the potential and the limitations of using games to teach and do research. In particular, we will discuss "normal" games to emphasize the key rules of a successful game play. Eventually we will see how to "gamify" your PhD as a concrete and practical example of how to turn a scientific project into a game.

TRANSVERSAL COURSES
ENGAGING PRESENTATIONS FOR THE SCIENTIFIC AND GENERAL AUDIENCES

INSTRUCTOR Eugenia Covernton
CONTACT eugenia.covernton@cri-paris.org
ORGANIZATION February 28th, March 1st and 4th

In this course students will improve their skills to delivering research talks that engage their audience and get their message across. Students will learn how to effectively present a clear message while enjoying the process of presenting their research. The main focus of the course is on how to adapt the message to different types of audiences (scientific, expert/non-expert and general audiences) and how to explain a complex subject using visual aids.
A short (half-day) practical session will allow students to present their own work and implement the learned techniques.

FIGURES FOR PRESENTATIONS AND PUBLICATIONS

INSTRUCTOR Diana Zala
CONTACT diana.zala@espci.fr
ORGANIZATION May 21st and 28th

During this hands-on workshop, students will explore the art of conveying a message through figures from scientific journal, oral and poster presentations. Students are highly encouraged to bring their own figures of documents they are currently working on, e.g. TAC report, poster or journal paper such that they have a tangible output from the workshop.

In a first theoretical part, we will cover the following topics:
• Role of figures
• Differences between figures for publications, oral and poster presentations
• How to design figures for different contexts and how to conceive a good poster
• What to do or not to do in figures
• Which colours? Be colorblind-friendly
• Recognizing good and bad figures
• Examples of software for preparing graphs, images, drawings and assembling figures

After this first theoretical introduction, students will have one week time to work on their own figures and bring back their results for the second practical part. During this second session, they will present to the class their results, so that they will have a constructive feedback.

EFFECTIVE READING

INSTRUCTORS Ray Horn
CONTACT ray.horn@free.fr
ORGANIZATION October 30th, November 6th and 13th

A three-day workshop (1 day per week) in reading skills for academic purposes
The goals of the course are:
• Gaining speed
• Refining reading practices
• Managing texts more efficiently
• Improving note-taking and retention skills

A variety of texts will be used to work on these different skills, and students should plan on working on their own scientific texts between sessions.
The content includes analyzing individual reading habits, understanding reading as a process, viewing how information is processed, and developing personal objectives.

Priority will be given to non-native-speakers.

IDENTIFYING AND LEVERAGING YOUR SKILLS FOR AN EFFICIENT JOB SEARCH

INSTRUCTOR David Karlin
CONTACT davidgkarlin@gmail.com
ORGANIZATION February 18th-19th

Students will learn how to identify their key skills and transform them into an offer of services. Indeed, researchers have numerous technical skills, but also other "transferable" skills of they are probably not aware. Such skills may include working in a multicultural environment, dealing with failure, communicating efficiently, etc. Presenting these skills as an offer of services will improve job search prospects, as employers are not necessarily looking for precise transferable skills, but for what services researchers can offer them.

// GAINED SKILLS //

· Identifying your key transferable skills
· Presenting them concisely as an offer of services
· Carrying out informational interviews to get your chosen job

// CONTENT //

· Common transferable skills of PhD students
· A systematic method to present and evidence your skills: selling points
· Transforming your skills into an offer of service
· A methodology to make the best possible CV
· Why you must go out there and knock on doors to get a job
· Informational interviews
· Practical application:
  - Design a better CV
  - Get 2 informational interviews before the course

TIME MANAGEMENT, PRIORITIES AND PERSONAL ORGANIZATION

INSTRUCTOR Aurélien Baelde
CONTACT aurelien.baelde@gmail.com
ORGANIZATION November 20th, December 11th

This training is dedicated to the improvement of time management and personal organization of PhD Student.
The training will take place in 2 sessions: the first one is dedicated to the presentation of tools and methods, and the second one to feedbacks on how the participants were able to use the training.

Our brain receives 5 times more information than it can handle daily, leading to a strong need to select high value tasks and to be able to implement them in an efficient manner. Such tools are now compulsory to strive in the current, very competitive research environment. Even if research results are not predicable, actions that lead to such results are. Learning to plan and organize research reduces uncertainty and therefore PhD student stress.
The aim of this training is to provide methods and tips on time management, priority management and personal organization in the context of research projects, and addresses several issues related to PhD students work.

The training is built on 3 aspects:

1. First, students will learn how to identify high value tasks associated to their personal project and objectives, and how to organize their working day taking into account these high value tasks.

• What are the strategic tacks of my project?
• How to organize my day?
• How to measure my progress?

2. Then, student will learn how to improve their work intensity using several methods linked with their brain natural behavior. This part is strongly related with the reduction of stress and tiredness.

• How to reduce stress and tiredness?
• How to harness the full potential of modern communication tools?
• Why and how to build my 3rd pillar?

3. Finally, the last part deals with the laws of productivity, and explains how to use these laws to reduce dead times during the day. Procrastination reduction and habits creation methods are proposed to promote the future use of the elements provided during the training.

• Laws of productivity: how to take advantage of your own behaviors?
• How to defeat procrastination?
• How to create habits?

THE VALUE OF SCIENCE

INSTRUCTOR Andres Couve
CONTACT andres@neuro.med.uchile.cl
ORGANIZATION April 17th, 19th, 24th, 26th and 29th

This workshop sets off to provide the time and the inspirational atmosphere to reflect on the broad value of science in today's society.

In an era of short-term goals driven by economic needs and governed by competitive and standard parameters, the wider value or impact of science for life has been overlooked. Variable degrees of appreciation possibly exist depending on whether the problem is analyzed in the context of more or less developed countries, and perhaps a handful of exceptions may be recalled, but the issue is essentially the same no matter where we go. Why is this? By analyzing the fundamental characteristics of contemporary research we will work to develop a renewed argument on the value of science to society.

We will discuss the difficult issue of measuring how fruitful science is to individuals and the community at large. First, we will examine science as an act of joy, impacting creativity and education. We will then study the pursuit and accumulation of scientific knowledge, a curiosity driven intellectual enterprise, as an end onto itself and not exclusively as a means to an end. Finally, we will consider more conventional, concrete and immediate utility criteria such as technology, and examine the role of science in power, democracy and the organization of social life.

Finally, we will explore the institutional changes that may support a new agreement between science and society. Our attempt is to navigate countercurrent, away from the majority of studies that focus on the economic dimension of science simply because it is easier to measure, and explore other areas of influence, whether indirect, diffused in space and time, or simply intangible, that have been investigated less systematically or seldom used to guide public policies.

We will develop a 5-session workshop (4 h per session plus an introductory session of 1 h) to study how science impacts society at multiple levels including economic, political, social and cultural. The workshop will be targeted to approximately 10 PhD students. It will include selected readings, research of cases and examples, group discussions and a summary of collective conclusions. We will work on four areas:
1. Joy;
2. Knowledge;
3. Technology, power and the organization of social life;
4. Renovated institutions.

The task will be co-creative. Students are expected to investigate cases/examples of impact for each session. I will contribute with my previous experience as a committed scientist, my involvement in outreach, education and science advocacy as Director of BNI (www.loligo.cl) and my expertise in the boards of non-profit organizations (www.puertodeideas.cl, www.fundacionvivechile.cl) to outline the logic of the general argument and help identify topics of discussion.

We expect to elaborate a product draft to summarize our conclusions as a written document or audiovisual piece. This product will be used and distributed in subsequent courses, lectures, outreach activities, online platforms. If possible, it will be converted into a publication-type article for a wide interest science journal/book.

BEYOND SCIENTIFIC THINKING

INSTRUCTOR Aurelien Peilloux and Charlotte Salvatico
CONTACT aurelien.baelde@gmail.com and csalvatico@imaginesciencefilms.org
ORGANIZATION December 5th-6th, 18th-19th, January 8th-9th

// OBJECTIVE //

To become aware of the frameworks that shape scientific thinking, to ponder on the creative process and to develop a sensitive approach to research from a personal artistic work.

Research-as-creation
Art-science
Creative process
Emotions
Reflexivity

After completing graduate studies in physics and biology, Aurélien Peilloux entered La Fémis in order to learn film-making. At the same time, he carried out at the CRI a PhD on the relationships between art and science, both in the works and in the creative process.
During her thesis in neurosciences at École Normale Supérieure, Charlotte Salvatico co-wrote and directed an hybrid short film intertwining the dissemination of scientific knowledge and the loss of the loved one, with the involvement of dance students of the Conservatoire national.

// DESCRIPTION //

Aurélien and Charlotte will question the framework of thought that underlies the scientific approach, that is to say its founding paradigms, implicit rules, from the assumption of objectivity implying a separation between the subject and the object to the postulate of objectivity.
A reflection on the creative process and on its vivid contradictions will allow students to become aware of the whole emotional, subjective and irrational part of any research process.
Finally, a personal artistic work will be required so that the students will experience an approach both close and far away from the scientific practice: based on their personal life or using elements to which they are sensitive, they will have to create an object that will express their questioning sensitively rather than rationally. Re-establishing the link between Being and Being-in-the-world, they will be led to think of ethics from an inner, sensitive and personal perspective.

// FORMAT //

The course will be divided into three sessions of two days which will include:
"Alive theory" module: theoretical teaching, open discussions and debates :
- Framework of scientific thinking (birth of experimental science, founding paradigms, subject/object separation) : what scientist am I to the world?

- Introduction to research-creation and didactic of artistic creation (founding principles and necessity, methodologies, epistemology of the mystery)
- Tiers included and creation (dynamic contradictions, complex thinking)
- Reasoning with emotions (sensible approach of the world, idea-feeling, logic, intuition and advances in neurosciences)

Personal enquiry module: Creation of yourself by the creation - several collective sessions over the duration of the semester.

Conception of an artistic object in a chosen form (film, photo, story, etc.) structured around a central motif in the life of the student and his/her research.

"Off the beaten path" module (3 sessions of 3 hours): Plurality of point of view encouraged by a shared experienced
Invitations of researchers / artists to present their art-science field trips.

SENSE ABOUT SCIENCE: THE ROLE OF EVIDENCE AND SCIENCE IN SOCIETY

INSTRUCTOR Sense about science EU team
CONTACT hello@senseaboutscience.org
ORGANIZATION January 24th

Climate research, biotechnology, nanomaterials, vaccination... More and more research fields are suffering from a bad reputation with large parts of the public. This can even result in regulations which make further research and innovation difficult.
How can you make your voice heard in polarised debates? How can you prevent further polarisation? How can you make sure that your research benefits society and that the public understands the benefits?
We will start this course with an ice-breaker exercise, sharing some of our own experiences with the public perception of our research.
From these experiences, we will learn how you can improve your interaction with citizens, how you can open up to society and how you can defend evidence in controversial topics.

In the second part, we will focus on the role of research and evidence in policy. Where lies the balance between evidence and values? What is your role as a researcher in evidence-based policy? How do you interact with politicians and how do you inform policy? With some concrete examples, we will learn how you as a young researcher can make a difference in society.

Outline of the course:

- Introduction: what is Sense about Science EU, what is my perspective?
- Why should you care, as an early career researcher, about the use of evidence and science in society? Why should you care about EU policy?
- Impact of misinformation (vaccination, detox,...)
- Importance of well informed societal debates (e.g. climate change)
- Impact of policy and polarised debates on research (e.g. biotechnology)
- Citizens care about evidence! -> responsibility of researchers towards society
- What is the role of evidence in public debates?
- Good and bad examples of public debates and public engagement
- How can young researchers make a difference?
- What is the role of evidence in EU policy?
- Outline of the policy process, balance between evidence and political debate
- Current mechanisms of science advice
- How can young researchers make a difference?

NATURALIST AND SCIENTIFIC ILLUSTRATION

INSTRUCTOR Julien Norwood
CONTACT juliennorwood29@gmail.com
ORGANIZATION 4 sessions (one a week) in March

Hand illustration is still one of the best tool to describe behaviors, morphological characteristics and subtleties between different species or individuals of plants & animals. Whether using ink line drawing or paint: studying your subject in a goal to illustrate it is also a new way to discover it in depth, and find new approaches to analyze it. This new artistic skill will add to your work a scientific iconography that combines professionalism and accuracy, with a rewarding self-made and personalized touch.
The course is opened to any level. Art material supplied (paper, pencils, ink, paint and brush)

// COURSE OUTLINE //

— Session 1:
- How to represent your subject, and what medium is best?
- Draw it with a pencil: how to take proportions?
- Once the drawing finished, report it on the final paper.

— Session 2:
- Learn to "create" the volume" with shades of Black&white, or colour.
- Start placing the general volumes and details on your illustration.

— Session 3:
- Create the textures (if necessary): hairs, scales, reflections, veins on the leaves…

— Session 4:
- Finish the final touches of light and shades.
- Clean the illustration: first with a blade or paint, then you scan and clean your illustration on Photoshop.

ONLINE LANGUAGE LESSONS: FRANTASTIQUE AND GYMGLISH

INSTRUCTOR Elodie Kaslikowski
CONTACT fdvphd@cri-paris.org
ORGANIZATION self-paced study

This courses aim to familiarize non-native speakers with the French and English languages. Each morning you will receive an e-mail with an assortment of written content and audio recordings. Each lesson takes 10-15 minutes to complete and includes a story with dialogue, questions, 'mini-lessons' and revisions. After clicking the 'send' button, you'll receive your e-mail corrections with your score of the day, explanations on why you got each question right or wrong, transcripts of the audio recordings, the vocabulary you wanted to learn more about, etc.
The next lessons will be customized according to your previous answers, your expectations and your needs.

GROUP LANGUAGE LESSONS: FRENCH AND ENGLISH

INSTRUCTOR AIRE team
CONTACT masteraiv@cri-paris.org
ORGANIZATION 1 hour sessions every week for French lessons, 1 hour sessions every 2 weeks for English lessons

Group language courses are offered to PhD and Masters students at the CRI who want to learn/ improve their French or English. The focus will be on general communication, not specifically on science communication.

Students who register will have unlimited access to the InLingua online learning system plus weekly or biweekly small group lessons. An assessment test will be given to determine the students' level and place him/her in a group.

The French lessons will be given for one hour once a week for 6 months. The English lessons will be given for one hour every other week for 6 months. All of the lessons will take place at the CRI. The lessons will likely be in the evening on a weekday, but the exact dates will be determined once all interested students have completed the assessment test.