A Guide to Montpellier, its University, its labs for MEME students

September 2014

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MEME and Non-MEME contact persons

Local MEME coordinator

Isabelle Olivieri

Professor at FdS (Faculty of Sciences) and performing research on plant evolutionary biology, evolution of dispersal, and experimental evolution

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Yannis Michalakis

Director of research at CNRS, performing research on host-parasite interactions and life history evolution.

Contact: Yannis.Michalakis@ird.fr, (+33) 4 67 41 61 54, mivegec.ird.fr/index.php?option=com_content&view=article&id=57&Itemid=97&selected=59&lang=en

All correspondence should go to IO with copy to YM. In the following, every time it is written that a student must inform IO or every time a student has a question for her, a copy should be sent to YM

The e-mail of the coordinators finishing with evo.edu should not be used by the students.

Non MEME

Catherine Moulia
Professor at FdS (Faculty of Sciences) and performing research on host-parasite interactions, coevolution, head of the Master 'Ecologie-Biodiversité'.
Contact: catherine.moulia@univ-montp2.fr

Living in Montpellier

About the city

As students will notice, a lot of things (websites, banks...) are in french. But they should not be afraid! In the end, everybody manages perfectly well! Administration in France is a bit out of hand. Like a small darkhole of paperwork. Most of it is in French. Students will find on the wiki page how to deal with it. If the procedure changed, please tell, so that others can benefit from the experience. On the wiki, students will find information on french legislation, bikes, cars, shopping (supermarkets, farmers markets), on mobile phones, banking, learning french, going out (pubs, restaurants, movie theaters, theaters, beach, hikes...), french culture.

Letter of admission

Students should inform IO as soon as possible that they are interested in coming during any semester. Students will receive a letter of admission from the Faculty of Sciences (currently, from Luce Cardenas: luce.cardenas@univ-montp2.fr; the students must write to IO if they did not receive it).

Application for residence permit

With the letter of admission students can ask for a visa. The student is likely to have obtained a VISA "D" long séjour étudiant (CESEDA R311-3 6°). The head of international office is Emilie Blanchard.

Information is here: http://www.pres-suddefrance.fr/web_anglais/inter-etudiants_angl.php, and in the following: upon arrival in France, the student must complete the document OFII* sent by the Embassy or the Consulate and send it ('recommandé avec accusé de réception', available at the Post Office) with a copy of passport (ID + visa + stamp showing the entry in France) to

Office Français de l'Immigration et de l'Intégration,
"Le Régent" - 1er étage
4 rue Jules Ferry
34000 Montpellier

As soon as they have received the documents, the application is registered and an 'accusé de réception' is sent to the student. The student then receives a convocation for a medical visit. The local office then puts a stamp in the passport which allows the student to stay legally in France while the visa is valid. This visa is then considered as a residence permit.

Renewal of residence permit

Before the visa expires (at most 2 months before), an application for renewing the residence permit must be made at the international office of 'PRES Sud de France'
Contact:

PRES Sud de France
163, rue Auguste Broussonnet,
Institut de botanique (ground floor),
Montpellier.

In order to do so, students need to get an appointment. That can be done through http://www.herault.gouv.fr/Demarches-administratives/Ressortissants-etrangers/Demande-de-titre-de-sejour-pour-etudiant-stagiaire-ou-scientifique (in french).

Bank accounts

The students will find some information on the wiki page. They should also visit http://banksfrance.com/france/montpellier

University issues

Housing issues

The university is providing housing, through the housing center "**CROUS"**. CROUS rooms are usually relatively cheap, furnished with the minimum stuff, vary in size and are located in different places of the town: the "cité universitaire" (cité U). Students will find more information on the different cities in the MEME Wiki, students experiences and advices. Students should inform IO that they need a room as soon as possible. IO will write to the appropriate person and the students will receive an offer (in December or January for S2, in July for S1), which should be dealt with quickly. For M2S1, they might have to change room during the summer, as some buildings are closed.

Students staying during the summer (S2 or S4) might have to change room during the summer, as some buildings within residencies are closed.

University registration process

General registration

With the visa if needed, students can register at the Faculty of Sciences (Faculté des Sciences) of UM2 from early September onward. This is done (only early September) in the House of students (located at the entrance of the university). The student should pay neither registration fee for the university nor Health service fee. Indeed, registrations fees are already paid by MEME, and the student should already have the international Erasmus Mundus insurance. A student may however want to pay for French Security depending on what kind of health need the student has, as the coverage can be better for some medical acts than the Erasmus Mundus insurance.

Pedagogic registration

A 'pedagogic registration' to each teaching unit is still necessary (PIE), go and see Evelyne Machetel (evelyne.machetel@univ-montp2.fr).

University Pedagogic Student Network

Finally, students should register on the "espace pédagogique" (http://mon.univ-montp2.fr/)e**,** which will give them access to course documents, and university services, such as webmail *etc.* Password is set up as MEME.

Deadlines

To inform IO about your coming the following semester:

M1: mid-November
M2S1: mid-June
M2S2: mid-November

Short report

M1: mid-April
M2S1: early October
M2S2: early March

Final report

M1: mid-June
M2S1: early February
M2S2: mid-August

Doctoral school competition

mid-June

Arrival dates

M1: early February
M2S1: mid-September
M2S2: early February

University wwwsite

There used to be three Universities (including UM2, University of Sciences and Technology, of which the Faculty of Sciences is one of seven components), but since September 2014, there is only one big university. So some things might change at some point… But before that, students can have a look at http://www.english.univ-montp2.fr/ for an overview of UM2.

Student speakers

Student Speakers, who are in charge of representing students to the administration, must be locally elected every semester and for each level.

Information days

There are two welcoming days. One in september for new M2 and one in February when lectures start. These days include a brief presentation of the university. All students should suscribe to evoldir by sending a mail to brian@helix.biology.mcmaster.ca and to evolmontp or evolfrance by sending a mail to pierre.boursot@univ-montp2.fr.

Courses

For organization reasons, lectures in the university cannot be set up for much less than 10 people. Since the lectures in February and March have been set up especially for MEME M1 students, they are required to attend to all courses.

M1 courses represent 15 ECTS (6 x 2.5), the other 15 ECTS being based on the project.

Lectures at Montpellier:

1. Reading papers and seminars (2.5 ECTS)

Code: FMOB223
Organization: Oliver Kaltz <oliver.kaltz@univ-montp2.fr>.
Contents:

- 10h (responsible person: O. Kaltz) of reading papers in genetics and statistics. As it is new, the contents are vague.
- 1h / week of seminars (in 2013 in english: Troy Day, Jean-Nicolas Jasmin, Caroline Nieberding, Lindi Wahal, Rees Kassen, Asger Hobolt, Aabir Banerji, Julia Fisher, Ashleigh Griffin, Barry Sinervo, Helen Alexander, Alison Duncan).

2. Hot topics in ecology (2.5 ECTS)

Code: FMOB220
Organization: Doyle McKEY, d_mckey@hotmail.com
Contents: Each class session, a group of three people (exceptionally two) will be responsible for that session's topic. Each person should participate in leading two of the sessions. Doyle will give each group a small selection of recent papers that they will use to begin to explore the topic, or the groups will find these themselves. Among the papers, the group will suggest (one week before the class session) one-two papers that everyone should read before class. The group will be responsible for **presenting the topic** to the rest of the class and **leading discussion** of it. The group presentation should explain why the topic is interesting and present the state of the art, outlining points of controversy and defining big open questions.

Topics treated in previous runs of the course:
Transgenerational transmission of heritable epigenetic variation; Cultural evolution; Cultural group selection; Comparative studies of agriculture in protists, animals and humans; Darwinian agriculture: what can artificial selection do that natural selection cannot?; Species diversity and ecosystem functioning: what relationships?; Spatial self-organization in ecosystems: processes and consequences; Origin of life; Life in extreme environments; Life on other planets?; Pleistocene overkill, ecological anachronisms and Pleistocene Park; Evolution within individuals: diplontic selection; cancer and evolution; The human microbiome: microbial ecology of the human gut; Neutral theory of biodiversity in community ecology; Sexual conflict.

3. Advanced statistics (2.5 ECTS)

Code: FMOB222
Organization: Céline Devaux, celine.devaux@univ-montp2.fr)
Contents: The course scans through both multivariate and univariate (linear models) analyses, and aims at providing students with (i) solid mathematical and theoretical background, (ii) insights into protocol and model building and (iii) knowledge for accurate interpretation of data. At the end of the course, students are well aware of many classical models in ecology and evolution and some estimation methods, and can thus autonomously build their own experimental designs and analyze their own data.

The sessions are as follows:
1. Introduction to multivariate statistics and description of some classification methods

2. Detailed description of principal component analysis
3. Detailed description of correspondence analysis
4. Brief recap of descriptive statistics and hypotheses tests
5. Explicit link between multivariate and univariate analyses, using multiple regression
6. Building simple ANOVAs and make *a posteriori* validation tests and group differences
7. Building ANOVAs with complications, such as random factors and non-independence
8. Insights into model selection, and discussion of students'own data and models

4. Advanced population genetics (2.5 ECTS)

Code: FMOB218
Organization: Yannis Michalakis, Yannis.Michalakis@mpl.ird.fr, with the participation of T. Lenormand and G. Martin)
Contents: The objective of this course is to provide the theoretical background for understanding, and potentially being able to use and apply the principles of how selection will affect the evolution of populations. Y. Michalakis describes the basics of selection theory and shows with elementary algebra that it is possible to derive some fundamental results in Population Genetics, such as Fisher's Fundamental Theorem. He also gives an introduction to mutation-selection balance and two-locus theory. The latter topics are put in perspective in the courses by T. Lenormand on the evolution of sexual reproduction, migration and local adaptation. T. Lenormand also presents the theory which allows understanding the dynamics of adaptation. G. Martin's courses explain how stochastic effects interact with selection to influence the fate of adaptive mutations.

5. Genetic data analysis (2.5 ECTS)

Code: FMOB219
Organization: Renaud Vitalis renaud.vitalis@supagro.inra.fr, with the help of R. Leblois
Contents: The objectives of this course are threefold (i) to remind the theoretical bases of some essential concepts of population genetics theory; (ii) to detail some 'classical' inference methods (e.g., F-statistics) and more 'modern' approaches (based, e.g., on coalescent theory); (iii) to show how demographic history may be inferred from the analysis of genetic polymorphisms.

The sessions are as follows:
1. Classical inference in population genetics. F-statistics provide a useful description of genetic structure at several levels (individuals, populations, *etc.*). The definition of F-statistics as well as the statistical framework used to develop estimates of these parameters will be examined, and then some application examples for the inference of sex-specific demography will be provided.
2. Inference of dispersal in isolation-by-distance models. Limited dispersal results in a correlation between genetic and geographic distances. How dispersal characteristics can be inferred from the analysis of genetic polymorphisms will be shown.
3. Maximum-likelihood and Bayesian inference in population genetics. Modern techniques of inference in population genetics are based upon maximum-likelihood and Bayesian methods. The principles of these methods will be shown, and some application examples with the software package STRUCTURE will be provided.
4. Coalescent theory. Coalescent theory provides a conceptual framework for the study of genetic variation in populations, and is the source of essential tools for making inference

about population evolutionary history. The basics of coalescent theory will be developed and some application examples for the inference of population size changes will be provided.
5. Measuring selection from gene frequency data. The recent advent of high throughput sequencing and genotyping technologies makes it possible to produce, easily and cost-effectively, large amounts of relevant information for the characterization of population genetic diversity, even for species for which a detailed knowledge of the genome structure is not yet available. How this information can be used to detect genomic signatures of past or on-going selection will be shown.

6. Modelling in ecology and evolution (2.5 ECTS)

Code: FMOB221
Organization: Sandrine Maurice, Sandrine.Maurice-Oms@univ-montp2.fr
Contents: Modelling is a methodology that is frequently used in biological sciences nowadays, in particular in ecological and evolutionary studies. However, models usually frighten students. The aim of this course is to show that modelling is by no means inaccessible. Hence, the aim is to familiarize the students with several modelling techniques, so that they can use them in their future work and so that they can better understand theoretical papers. Instead of being presented an exhaustive panel of techniques, the students will work by themselves on some examples. The course will thus illustrate by practical work the different phases of modelling, from the formalisation of the biological hypotheses to the exploitation of results. The students will work, alone or by two, on computers. They will tackle two problems, one in ecology and one in evolutionary biology. These problems will allow them to be introduced to several kinds of modelling and to use several programming techniques under R.

The sessions are as follows:
*Global introduction (3h):
-The different kinds of models
-How to choose between several models?
-How to confront models to data?
* Sex ratio evolution (12h):
- formalizing the question
- game theory approach (derivative calculus, equation solving...).
- simulation of data (random numbers drawing) and test by maximum-likelihood
- Sex ratio evolution with an explicit genetic determination of sex-ratio (equation iteration)
* Metapopulation dynamics (10h):
- formalizing the question
- deterministic approach (differential equations: analytic resolution and numerical resolution, stability of steady states…)
- stochastic approach (linear algebra, Monte Carlo simulations)

Evaluation

All courses have a final exam, the date of which is fixed with students. Marks in the French grading system go from 0 to 20 / 20. One need to have above 10 to pass.

Evaluation by teaching unit:
- Céline Devaux will give a written exam in statistics

- Doyle McKey will give a mark based on oral presentations and participation
- Sandrine Maurice will give a mark based on modelling projects
- Yannis Michalakis will give a mark based on presence, participation, homework and/or written exam
- Oliver Kaltz will give a mark based on presence, participation, homework and/or written exam
- Renaud Vitalis and Raphaël Leblois will will give a mark based on presence, participation, oral presentation of a research paper.

Students will be asked to evaluate each of the courses. It is strongly recommended that they fill the evaluation form, as it helps improving the courses, but the students do not always answer.

Example of schedule (2014)

(Lectures morning: 9:00-11:15 and 11:30-13:00; afternoon: 15:00-16:30 and 16:45-18:15)
MOD: modelling
HT: hot topics in ecology
RP: reading papers
SE: seminars (see below, until end of June)
STA: statistics
PG: population genetics
GDA: genetic data analysis

Arrival of most students : 8 february				
Monday	Feb	10	morning	MOD
Tuesday	Feb	11	afternoon	HT
Monday	Feb	10	morning	free
Tuesday	Feb	11	afternoon	free
Wednesday	Feb	12	morning	MOD
Wednesday	Feb	12	afternoon	free
Thursday	Feb	13	morning	free
Thursday	Feb	13	afternoon	MOD
Friday	Feb	14	morning	RP and then SE1
Friday	Feb	14	afternoon	MOD
Monday	Feb	17	morning	MOD
Monday	Feb	17	afternoon	HT
Tuesday	Feb	18	morning	free
Tuesday	Feb	18	afternoon	MOD
Wednesday	Feb	19	morning	RP

Wednesday	Feb	19	afternoon	free
Thursday	Feb	20	morning	MOD
Thursday	Feb	20	afternoon	MEME M2S1 defences
Friday	Feb	21	morning	SE2
Friday	Feb	21	afternoon	MOD
Monday	Feb	24	morning	PG
Monday	Feb	24	afternoon	HT
Tuesday	Feb	25	morning	PG
Tuesday	Feb	25	afternoon	free
Wednesday	Feb	26	morning	PG
Wednesday	Feb	26	afternoon	RP
Thursday	Feb	27	morning	PG
Thursday	Feb	27	afternoon	free
Friday	Feb	28	morning	SE3
Friday	Feb	28	afternoon	PG
Monday	March	3	morning	free
Monday	March	3	afternoon	STA
Tuesday	March	4	morning	free
Tuesday	March	4	afternoon	STA
Wednesday	March	5	morning	free
Wednesday	March	5	afternoon	STA
Thursday	March	6	morning	HT
Thursday	March	6	afternoon	STA
Friday	March	7	morning	free
Friday	March	7	afternoon	STA
Monday	March	10	morning	HT
Monday	March	10	afternoon	STA
Tuesday	March	11	morning	STA
Tuesday	March	11	afternoon	HT
Wednesday	March	12	morning	STA
Wednesday	March	12	afternoon	HT
Thursday	March	13	morning	free
Thursday	March	13	afternoon	HT
Friday	March	14	morning	free

Friday	March 14	afternoon	free
Monday	March 17	morning	PG
Monday	March 17	afternoon	free
Tuesday	March 18	morning	PG
Tuesday	March 18	afternoon	free
Wednesday	March 19	morning	PG
Wednesday	March 19	afternoon	HT
Thursday	March 20	morning	RE
Thursday	March 20	afternoon	free
Friday	March 21	morning	SE4
Friday	March 21	afternoon	RP
Monday	March 24	morning	free
Monday	March 24	afternoon	GDA
Tuesday	March 25	morning	RP
Tuesday	March 25	afternoon	GDA
Wednesday	March 26	morning	HT
Wednesday	March 26	afternoon	GDA
Thursday	March 27	morning	free
Thursday	March 27	afternoon	GDA
Friday	March 28	morning	SE5
Friday	March 28	afternoon	GDA
Monday	March 31	morning	GDA

Integration to French M2 courses

If their French is good enough, students may choose to integrate the local Master program in M2 (lectures from September to December, see http://www.masters-biologie-ecologie.com/blog/sciences/mention-ecologie-biodiversité for more informations).

Report guidelines and deadlines

Before a student starts a project

For M1 and M2, the project has to be written and agreed by the local coordinators. In particular, it should include Darwinian evolution (and not merely write that it might be relevant for evolution: we agree of course that 'nothing in biology makes sense except in the light of evolution', but it does not mean that all biologists do evolutionary biology!). This is a very important criterion and should not be overlooked or taken lightly.

Convention of stage

Once a project has been approved, the student must fill the on-line convention. This will be validated on-line by IO (she usually receives an automatic message and validates immediately; if it is not validated within 7 days, students should write to her with their convention number). Once validated, the student must print it and ask someone to sign it for IO (that is, this person, usually YM or someone from the Faculty of Sciences, must write 'p.o. Isabelle Olivieri' and sign). All M1 conventions should be given to Evelyne Machetel or Marjorie Aymar, who will ask the Head of the Faculty of Sciences (currently, Gilles Halbout) to sign it. It is more difficult to implement such grouping for M2 students, as those do not start at the same time. Students will find more details on creating this so called convention on the Wiki.

Gratification

The french law requires that labs give a small grant ('gratification') to each student spending more than 2 months in their lab (about 430 euros per month of stage). This will be great for the student, but it represents a substantial amount of money for the lab. The first consequence of that is that some students will have troubles finding a research project and this is in particular why **students should contact potential supervisors a long time in advance**. The second consequence is that students are expected to work hard and be very committed. The third consequence is that if students have to go somewhere for their work, it makes sense that they use this small grant, at least if they already have a grant from MEME, rather than ask for money from the lab. Some labs have little money, and can be helped by MEME, but this should be exceptional (at most, 1 M1 and 1 M2 per year).

Should a student stay or change?

Some students, who performed their M1S2 in Montpellier, may choose to stay another semester in the same lab. It makes sense, because it allows them to spend 3 + 6 = 9 months, sometimes more, on one project. But students are welcome to change subject, or go in another lab, eventually in a different university.

Where to perform a project? Some labs'website addresses and acronyms

(some are in French, but most websites are in English too):
https://www.univ-montp2.fr/mini-site-b3e/structures-b3e
For CBGP, see http://www.ensam.inra.fr/cbgp/?q=en
For AGAP, see http://umr-agap.cirad.fr/en/
For BGPI, see http://umr-bgpi.cirad.fr/index-uk.htm
For CRBM, see http://www.crbm.cnrs.fr/index.php/en/patrick-lemaire-uk

Evaluation of projects

Final evaluation is a single mark, that covers both the final report and the oral defence (presentation and answers to the questions).

The French grading system is such that students do not get for projects as high marks as in Uppsala or Munich, and marks are necessary to get a degree from UM2. A double marking system will be used: within UM2, according to local rules; within MEME, according to the same rules.

The projects (15 ECTS in M1S2, 30 ECTS in M2S1 or M2S2) will be systematically evaluated by the students. It is important that the students rate the projects.

Expectations for the projects

The students are expected to work hard, to perform a literature search, to be autonomous, to have good knowledge of science, to think well, to be motivated, to be well integrated to the lab, to take part in collective work, and, at least by the end of the research, to show technical skills, to write and speak well.

For M1 projects

The research is performed in April-May-June, the defence is before mid-July (on a date fixed before March) and consists in a 7 minutes presentation in front of all students and a jury made of 5-7 people, of which at least two have read the report (to be sent one week in advance). These two people will ask the student questions during 4-5 minutes, and the rest of the jury may ask their questions during 10 other minutes.

Students also have to write a short report mid-April (4 pages) containing introduction, material and methods, planned analyses and of course, references. This short report is here to hep students and they will get written comments that should be taken into account for the final version. These intermediate reports are supposed to help the students to organise their project and make sure no one is on a wrong track.

The final report (June) should be kept below 10 pages. The only valid reason for going over this length is if the student has particular complexities with the experimental design or had problem with the experiments that the student feels it is necessary for the reader to understand. The font should be 11 - 12 points, the interval 1.5 (students can play with margins). This limit includes the main text, figures, tables, references; it does not include the title, the Appendix and the abstract. The Appendix, which is only meant to be used by the lab, will not be read. Students will find, in Appendix of this guide, some advice on how to write the report. For those students who did not respect the report deadline, the mark will be decreased according to the number of days of delay. It may seem harsh, but being able to meet deadlines is very important in research.

For M2 projects

Research: September to mid-February or mid-February to mid-August.

Defence: mid-February or end of August (Skype possible but should be avoided if possible) in front of all students that are still in Montpellier. The presentation lasts 10 minutes. The jury is made of 3-4 people, of which at least two have read the report (to be sent one week in advance), who each asks question during 5’, the rest of the jury has 5-10’.

Report: short version early October or early March (5 pages), containing introduction, material and methods, planned analyses, references, on which the student gets written comments that should be taken into account for the final version; final report in February or August.

The final report is due in February or August. The report should be kept below 25 pages. The only valid reason for going over this length is if the student has particular complexities with the experimental design or had problem with the experiments that the student feels it is necessary for the reader to understand. The font should be 11 - 12 point, the interval 1.5 (students can play with margins). This limit includes the main text, figures, tables, references; it does not include the Appendix and the abstract. The Appendix, which is only meant to be used by the lab, will not be read by the jury. Students will find, in Appendix of this guide, some advice on how to write the report. For those students who did not respect the report deadline, the mark will be decreased according to the number of days of delay. It may seem harsh, but being able to meet deadlines is very important in research. .

Seminars

There are several research seminars each week, most of which are in English, and students (M1 and M2) should go to them whenever possible. They should ask questions, it is good training, and speakers like it! They are expected (*i.e.* it is compulsory) to go at least every Friday at 11:30, at 'salle de réunion' at CEFE, from October to June. See the website http://www.biodiversite-montpellier.org/page.php?id_rubrique=8&archive=0&debut= for more information. This is usually a good occasion to meet other students, and is *the* richness of Montpellier.

Language courses

They are free for registered students and organized by the Faculty of Sciences. « Français langue étrangère » is headed by Hélène Morzadec, <helene.morzadec@univ-montp2.fr>): students are grouped by levels and hence mixed with other students; these lessons usually occur once a week in the evening. Those who would like french lessons should say so to IO and Hélène Morzadec, and go to the courses...

PhD

Having a proper evaluation mark for a research project by mid-february will allow a student to apply to a PhD grant from the french local doctoral schools (interviews for Montpellier are early July each year, but there are few grants). See Wiki for more details on doctoral schools, what they are and how to apply.

Mentoring

French students usually do not have any mentor (they use their research supervisor as such). But if a student has any question (in particular regarding advises concerning projects), please ask Isabelle Olivieri.

Transcripts

Irma should have all marks, including those at Montpellier, ask IO to get marks from M1 with electronic signature. IO or YM will send marks for research projects to the students as soon as possible.

Requirements for the diploma

MEME students need to be registered **at least one semester** at the University of Montpellier and to have defended their research there (be it by skype). Their written report will be read locally. If a student goes to Harvard during M2, this student can be registered in Montpellier up to three semesters (M1S2, M2S1, and M2S2). Otherwise, a student can be registered in Montpellier up to two semesters (M1S2 and either M2S1 or M2S2).

Diploma

Contact: 04 67 14 30 37

No application is necessary, but it takes a year for the diploma to be available.

For those who can read french, information is here:
http://www.fdsweb.univ-montp2.fr/actualites/diplomes-master-2012-2013-644
Otherwise:
A student can pick it up (with one's ID) or ask someone (e.g., the student's former supervisor, another student,... **not the coordinators**) to pick it up.

In order to have someone pick it up, the student needs to formally give this person the permission to act as a proxy by writing a procuration letter ("lettre de procuration") as follow:

City, Date

Je soussigné(e), Surname and Name, donne procuration à XXX XXX pour retirer mon diplôme.

The student's signature

with XXX XXX the surname and name of this person. The student also needs to provide this person a copy of the student's ID. This person should go to the administration with one's own ID.

Appendix

General guidelines for the research

Many students have difficulty in writing up their first research papers, in particular with knowing what information to put into the introduction *vs* what goes into the discussion. The notes below are given as general guidelines for what information should go into each section. The following is modified from a handout prepared by Professor Parmesan (Austin, Univ. of Texas) for a class she was teaching to graduate students on how to write a research manuscript - therefore many of the wording examples are from climate change.

Introduction

The introduction should provide the reader with the necessary background to understand the context of the research being presented in the paper - so why you did what you did and why

someone from outside this area of research should care about your results. It's helpful to think of the introduction as addressing the following key issues:

- Set the Stage: Present the state of field and state the broad question any biologists should be interested in. This should be framed as broadly as you can
  - Why is this topic important?
  - Is it important in different ways to different audiences? If so, you often have to choose which audience you are targeting.
- The Set up = Place your study in the context of the broad stage that you built in the preceding text. Present gaps in knowledge on this topic, weaknesses in understanding, *etc.* This section should provide the 'set-up' that justifies the specific research you did.
- The hole = State how your study helps to fill this gap or helps to address the broader question in a novel way, or addresses a novel aspect of the broader question.
- The last paragraph is often a "road map" that lays out your specific research being presented in this paper. For example, you might end with the following sentence:
  - "Here we present an analysis of data from 2000 species in 35 studies which contained data on both biotic and climatic constraints operating at the boundaries of species' distributions."
  - Note that you should be careful NOT to give your results in the introduction. You should present your specific question and research design used to address that question, but not the answers you got.

Methods

- Your study system: This should have enough information for the reader to understand why your system is good for addressing the question you are addressing - this may be because of a lot of previous research on this species/system, which provides a good context for your own research - or it may include ease of manipulation - or it may just provide some background that helps the reader to have a vision of the study organism and field situation as they read through the experiments. Here you should also make clear any constraints you might have had in using this specific species or system - so include modifications to the 'perfect' experimental design that you had to make because of some aspects of working with or raising this species.
- Describe your experimental design and how you analyzed it. This should be detailed enough that the reader could duplicate your study. If this is very complex, authors often give a general description of the study here, but put complexities into an appendix.

Results

- results = Specific findings from your statistical analyses. This can also include graphical exploration if that led to key insights.
- Give all numbers you think are important, and present key graphs/tables here. You might also end up presenting graphics or tables in the discussion, but your main findings should first appear in the 'results' section, while more derived or synthetic findings might first appear in the discussion.

- Your assessments of the quality of the information should be embedded in your reporting. If you think there were any problems with the data, say so (and why).
- The results can end with a summary of results, but you usually save any synthetic or summary statements about results for the beginning of your discussion.

Discussion

- Synthesis of conclusions which follows from your synthesis of results. In other words, what do you feel the different pieces of evidence and different angles presented by all the different analyses and graphical presentations all add up to?
- Novelty: Clearly present which aspects of your study follow from what's known and which you feel are truly novel.
- Discuss some of the problems remaining, holes in knowledge, data or general information.
- You might include a section that has some of your own ideas about what should be done next, or where research should be going, or priorities for funding, *etc*. This is where to highlight your own insights that have formed over the course of reading up on this topic.
- The big picture: You should end your discussion with a statement of the 'big picture'. This should be a clear statement of the broader impacts of your results
    - What is the deep, underlying meaning?
    - What are the bigger impacts your results/conclusions could have on the field?
- It is often helpful to define impacts in terms of a broader field or a different field. For example, you might conclude your paper with a statement similar to the following:
    - "Our results provide an important contribution to the continuing debates about how species might respond to continued global warming." OR
    - "This conclusion has important implications for conservation planning in the face of future global warming."