

## **Career Development Plan** *(regularly updated)*

Name of fellow: **Lucía Yáñez-Rausell**

Department: Centre for Geo-Information, Wageningen University and Research Centre, The Netherlands

Name of Supervisor: Prof. Michael Schaepman, Dr. Jan Clevers, Dr. Zbyněk Malenovský

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### **BRIEF OVERVIEW OF RESEARCH PROJECT AND MAJOR ACCOMPLISHMENTS EXPECTED (half page should be sufficient):**

Recent advances in assessing the pigment and non-pigment systems of plants using high spectral and spatial resolution imaging spectroscopy have shown that deeper knowledge on the interaction of light with vegetation at leaf (needle), shoot, branch and tree level is required to better understand canopy reflectance. Current main challenges in assessing the pigment system (e.g. Chlorophyll a/b) and the non-pigment system (water, nitrogen, cellulose, lignin) in needle-leaf forests include proper estimates of clumping of the vegetation at various scale levels, proper separation of understory and overstory vegetation, as well as the separation of the canopy in photosynthetic and non-photosynthetic (litter, stems, branches, etc) components. In order to properly close the scaling gaps at the above levels, a model suite based on radiative transfer theory (PROSPECT, DART, 4SAIL2) will be used in combination with advanced experimental field methods (e.g., transmission measurements at needle level, shoot level experiments, etc) to simulate and validate imaging spectrometry data.

The work will concentrate on the development of spatially distributed needle-leaf forest parameters (biochemical/biophysical) at regional to larger scales using refined retrievals defined for sunlit vs. shaded canopy pigment system. Monitoring the effect of forest disturbances such as fire and insect outbreaks will be the final objective for the improvement on biochemical parameters retrieval.

Main goal is to design an operational non-invasive remote sensing method for spatial estimation of leaf biochemical (and potentially biophysical) changes in structurally heterogeneous needle-leaf canopies affected by natural disturbances, with particular interest on insect attack disturbances, by means of radiative transfer and imaging spectroscopy data.

### **LONG-TERM CAREER OBJECTIVES (over 5 years):**

1. Goals:

- Become a competent researcher who can conduct quality research independently: learn how to properly formulate research problems and how to design strategies to get to solve those problems, get a deeper knowledge in my topic and other related research areas, work on improving my critical abilities not only in research but in general daily life and get more experience in interacting and communicating ideas and results within and out of the scientific community.

- Get the PhD degree in 2011 and get results published in peer-reviewed international journals
  - Apply for a postdoctoral position in a different research institute in the same area of research after PhD
2. What further research activity or other training is needed to attain these goals?
- In general activities focused on: (1) broadening scientific knowledge; (2) improving knowledge in the research topic and technical expertise; (3) obtaining /strengthening research and communication competences and skills
    - Attending post-graduate courses
    - Participating in local and international discussion groups, workshops, seminars, and conferences
    - Visiting and collaborating with other institutions and researchers
    - Participating in field/flight campaigns
    - Writing and publishing research in scientific journals
    - Writing project proposals and improving skills to interact with other researchers and funding institutions
    - Participating in teaching/supervising activities

### **SHORT-TERM OBJECTIVES (1-2 years):**

#### 1. Research results

- Anticipated publications:  
4 papers on forest disturbance effects monitoring by means of radiative transfer and imaging spectroscopy data
- Anticipated conference, workshop attendance, courses, and /or seminar presentations:
  1. Post-Graduate Courses:
    - Information Literacy, organized by Wageningen Library at WUR, November 2007, The Netherlands (Attended)
    - 2 courses in IDL programming organized by CREASO in December 2007, Germany (Attended), and by WUR in February 2008, The Netherlands (Attended)
    - Fire as a Driver of System Processes organized by PE&RC graduate school at WUR, April 2008, The Netherlands (Attended)
    - PhD Competence Assessment organized by PE&RC graduate school at WUR, April 2008, The Netherlands (Attended)
    - Basic Statistics organized by PE&RC graduate school at WUR, June 2008, The Netherlands (Attended)
    - Advance statistics organized by PE&RC graduate school at WUR, June 2008, The Netherlands (Attended)
    - Techniques for Writing and Presenting a Scientific Paper organized by PE&RC graduate school at WUR, October 2008, The Netherlands (Attended)

- Presentation skills organized by WGS at WUR, January 2009, The Netherlands (Attended)
  - HYPER-I-NET e-learning courses (in progress)
  - Summer Course Inverse Modeling for Improving Environmental and Ecological Models at Amsterdam Graduate School of Sciences, July 2009, The Netherlands (Attended)
  - Writing Grant proposals organized by WGS at WUR, (Planning to attend)
  - Career perspective organized by WGS at WUR, dates to be determined (Planning to attend)
2. Attendance to local seminars and workshops:
- International workshop "1st WIMEK workshop on Earth Observation and crop growth modelling", October 2007, The Netherlands (Attended)
  - International workshop "Sensing a Changing World", November 2008, The Netherlands (Attended)
  - "Remote Sensing of the environment" workshop, organized by Centre of Geo-Information and Remote Sensing at WUR, January 2009, The Netherlands (Attended)
  - Seminar on Remote Sensing organized by Institute for Environmental studies, Vrije Universiteit Amsterdam, May 2009, The Netherlands (Attended).
  - Other up-coming local seminars
3. Attendance to Wageningen university PE&RC graduate school annual meetings and seminars offered for PhD students:
- PE&RC Seminar day -Farming Futures in Sub-Saharan Africa, January 2008, The Netherlands (Attended)
  - "How to do a PhD in 4 years" workshop April 2008, The Netherlands (Attended)
  - PE&RC day workshop "Expect the Unexpected in Research", November 2008, Netherlands (Attended)
4. Attendance to HYPER-I-NET activities
- 1st HYPER-I-NET summer school, October 2007, Spain (Attended)
  - 2nd HYPER-I-NET summer school, September 2008, Netherlands (Attended)
  - Mid-term meeting, March 2009, Germany (Attended)
  - 3rd HYPER-I-NET summer school, September 2009, Italy (Attended)
5. Contribution and attendance to other international conferences and workshops
- XXI ISPRS Congress, 3-11 July 2008, Beijing (Poster contribution)
  - 2nd workshop of PHYSENSE (Nordic Network on physically based remote sensing of forest), June 2008, Finland (Attended),

## 2. Research Skills and techniques:

Acquisition of experience in experimental design, quantitative and qualitative methods, relevant research methodologies, data capture, statistics, analytical and critical thinking skills within the project is planned to be done by means of:

- Post-graduate course attendance focused on the research topic and in strengthening research and communication skills ( See section 1)
- Literature review on the topic and on other research areas
- Participation in PhD discussion groups and local/international scientific groups and meetings
- Collaborating with other research projects and groups
- Reviewing conference/journal papers
- Planning and performing data field and flight campaigns
- Learning and developing methodologies for data processing and results analysis

## 3. Research management:

- Get experience in writing proposals (i.e. the project proposal was written by the appointed ESR during 1<sup>st</sup> year)
- Get experience looking and applying for funding (i.e. attending post-graduate courses like “Writing Grant proposals”, see section 1)
- Develop a training and supervision plan for the full project (i.e. the appointed ESR wrote a plan during the first year and it was approved by a scientific committee at Wageningen University)
- Develop a time planning for the different stages of the research project (literature review, data acquisition, data processing, results analysis, collaborations and paper publications): strategies and deadlines (i.e. the appointed ESR included the time planning for activities directly related with the research topic in the approved training and supervision plan)
- Get experience in working with others in teams, i.e. the appointed ESR has participated in a field work campaign as collaboration with other project (July-August 2008) and was part of a team during a field/flight campaign organized in the study area during May 2009.

## 4. Communication skills:

- Get better experience in presentation skills, poster presentations and scientific writing by means of courses (see section 1, Techniques for Writing and Presenting a Scientific Paper, Presentation skills, writing proposals course)
- Preparing scientific papers within the frame of the PhD
- Attending international conferences and workshops and contributing with poster and oral presentations
- Participating in lectures within the university or other groups

- Actively participating in PhD discussion groups within Wageningen University (the appointed ESR is already member of 2 discussion groups since the first year of appointment) as well as in other scientific periodical meetings within WUR groups.
5. Other professional training (course work, teaching activity):
    - Contribute in the supervision of MSc students
  6. Anticipated networking opportunities
    - International conferences and workshops attendance
    - Participation in HYPER-I-NET activities
    - Exploring potential collaborations with other research groups
    - Participation in other projects within the host university
  7. Other activities (community, etc) with professional relevance:
    - Course “PhD Competence Assessment” organized by PE&RC graduate school at WUR, April 2008, The Netherlands (Attended)
    - Course “Career perspective” organized by WGS at WUR, dates to be determined (Planning to attend)

Date & Signature of fellow:

Date & Signature of supervisor