

**COST Action CA16212**  
**Action Title: Impact of Nuclear Domains On Gene Expression and Plant Traits**

**Management Committee Meeting**  
**El-Escorial, Spain**  
**Wednesday 11th December 2019**

**1. Welcome to participants (Christophe Tatout)**

- Christophe Tatout (Chair) welcomed everyone and opened the MC meeting.
- Everybody knows well each other MC members so that interactions/discussions were greatly enhanced during the MC meeting.

**2. Verification of the presence of two-thirds of the Participating COST Countries or, if applicable, a quorum**

- **15 Attending countries** (country/number of MC and substitutes): Bulgaria/1, Cyprus/1; Czech Republic/2, France/2, Hungary/1, Ireland/1, Israel/2, Netherlands/1, Poland/3, Portugal/1, Serbia/2, Spain/1, Sweden/1, Switzerland/2, UK/1
- **Observers:** none
- **7 countries** were expected to attend the main meeting and then the MC meeting but finally did not come due to health or family issues or because of a too tight time schedule. Austria, Belgium, Bosnia, Greece, Italy, Norway and Germany.
- **To do:** The MC committee decides to proceed through an electronic vote to be organized by the Chair to approve the MC Minutes (*Done by Monday January 6<sup>th</sup> 2020*).

**3. Adoption of agenda**

The Agenda sent by email to MC members and substitutes on November 23<sup>rd</sup> 2019 was approved.

**4. Approval of minutes and matters arising of last meeting**

The minutes of the last MC meeting (MC3) sent by email to MC members and substitutes on November 23<sup>rd</sup> 2019 was approved.

**5. Update from the Action Chair**

**a) Status of Action: start and end dates of Action, participating COST countries, participating NNC/IPC institutions and Specific Organisations.**

- The Chair reminded members of the Action start and finish dates: **28/11/2017 to 27/11/2021**
- INDEPTH has a **new Grant manager** from Feb 1<sup>st</sup> 2019, Franziska Fischer. She is the person to contact for questions and will respond to the general email address [indepth@uca.fr](mailto:indepth@uca.fr) (mail can also be seen by Aline Probst and Christophe Tatout).
- Participating COST countries: 25 full member countries, + 4 NNC (Armenia, Russia, Tunisia, Ukraine) + 2 IPC (USA, Japan).
- Since the beginning of the Action we had 3 different administrative officers : Tania Gonzalez-Ovin (12/2017- 04/2019), Nathalie Warengnien (04/2019-09/2019) and Sarah NINANE (09-2019-)
- And also 3 different science officers : Ionna Stavridou (12/2017-09/2019), Michael Pero (09/2019-11/2019) and Dominique Vandekerchove (11/2019-).

**b) Short Term Scientific Missions (STSM): ongoing STSMs and agenda for reports,**

- 18 STSM applications, 15 STSM funded, only few have been refused as application was not clear or did not fit to the INDEPTH objectives.
- Budget: ~32K€ for 15 STSM / 15 months (2130€ / STSM) Gender balance: 11 F / 4 M
- Small bias of STSM from and to laboratories in France, but as illustrated by the Chair can partially be explained by the presence of more French labs in the consortium.

## 6. Update from the Grant Holder: Action budget status (Chair)

### **Budget:**

- year 1: ~ 73 000€
- year 2: ~125 000€ (118 000 spent)
- year 3: ~119 000€

### **Highlights from the Grant Period 3:**

- **1 Dissemination meeting** in Cologne (European Workshop on Plant Chromatin, EWPC) (New MC substitute from Germany: Kalyani Krishna),
- **1 Annual Meeting** in El Escorial (December 2019): ~ 100 attendees
- **2 Training schools:**
  - **Training School 1** (July 2019): Nuclear Proteomics, 17 attendees (students and staff members) funded by INDEPTH, organized in Olomouc, Czech Republic (organizer: Marek Sebelka).
  - **Training School 2** (September 2019): From Pictures to Numbers, 29 students including 6 students funded by INDEPTH, organized in Antwerpen, Belgium (organizers: Winnok De Vos and Dimiter Prodanov).
- **WG1 Taggathon** in Plant 3D imaging (September 2019, Lisbon, Portugal – organizer: Ana Paula Santos), 16 people in total, 7 funded by the COST
- Results from the WG1 workshop:
  - training of the attendees / OMERO team
  - setting-up of 3 OMERO Servers in 3 countries (Cyprus, USA, Clermont-Fd) connected to each other with the ability to mirror all the images.
  - Published 3D images of plant nucleus are made available for the public for training purposes, benchmarking of softwares...etc.
  - In the future, it could be possible for INDEPTH members to share with collaborators a specific set of images. It is also planned to provide DOI for new datasets included in a new publication (provide link to the reviewer).
- **Publications: 19 publications** are related to INDEPTH activities. All MC members are encouraged to acknowledge COST INDEPTH networking support. Also in some cases open access can be granted, then one should acknowledge financial support from INDEPTH.
- **3 open access publications** were funded
  - Rutowicz, K et al. (2019). *Genome Biol* 20, 1–22.
  - Dumur, T. et al. (2019). *Nucleus* 10, 181–212.
  - Mikulski, P., et al (2019). *Plant Cell* 31, 1141–1154.

## 7. Update from the COST Association

Our new Administrative officer is Sarah Ninane and new Science officer is Dominique Vandekerchove.

## 8. Monitoring of the Action

The Chair asked the members to be dynamic and to propose ideas for the Action, we are all very busy, but we should be motivated to contribute!

For the current budget : we still have 20 000€ to spend up to March 2020.

- **To do:** investigate possible Open Access fees, workshop, ITC conf. grants and dissemination meetings to spend the remaining budget

3 main points were discussed.

### Next main meeting and MC meeting

There will be many events in 2020 and 2021 organized by the Plant community.

- NEUBIAS COST-Action: **4-6 mars 2020**, Bordeaux
- International Nucleosome Consortium (INC) COST Action: first main meeting **10-11 March 2020** in Krakow, Poland
- SEB meeting with the Special session on “DYNAMIC ORGANIZATION OF THE NUCLEUS ACROSS KINGDOMS”: **6-10 July 2020** (organizer David Evans, Katja Graumann)
- Eucarpia meeting **7-10 july 2020**, Rotterdam (Draga Miladinovic may organize a new workshop with Industry)
- 20th International Sunflower Conference **22-25 June 2020**, in Novi Sad, Serbia (Organizer Dragana Miladinovic)
- EWPC in Prague in **May 2021** (organizer: Iva Mozgova)
- ICAR Meeting Belfast **Juin 2021** (Organizer: Geraint Parry), there might be a plenary session on Chromatin domains.

Proposition of the MC committee is to have

- 1 MC meeting in Brussels in 2020 (between July and September)
- 1 main meeting including MC meeting in 2021 (January or later in October?).
- **To do:** organize an electronic vote to decide the best scenario for the next main meeting

### **Next Scientific Report = Progress report 2**

We already submitted a **PR1** in December 2018. The feedback from the Scientific Committee was “Implementation sufficient” meaning that the Action was well implemented for the different criteria.

WG leaders have made a great work collecting large amounts of information from all members about new ongoing collaborations, publications and actions related to objectives. This will be of great help to write the PR2. Every objective and every deliverable must be commented/evaluated in terms of achievement in PR2 and the Chair may solicit members to get input on a specific section of the report.

- **To do:** submit the second progress report (**PR2**) by December 27<sup>th</sup> , 2019.

## 9. Implementation of COST policies on:

### a) Promotion of gender balance and Early Career Investigators (ECI)

The overall gender equality is very good: close to 50/50. We need to try to do our best in keeping the balance, although science should be the important part. For instance, it is not easy when deciding on the STSMs.

## **b) Inclusiveness and Excellence (see below list of Inclusiveness Target Countries)**

1 new country will join the Action: Moldova (ITC). The electronic vote was used to gain the agreement from each country member: **25/25 agreed that Moldova should join the Action.**

Summary of member countries

- At the starting point of INDEPTH (Dec 2017): **19 countries** including **4 ITC**, 2 NNC and 2IPC
- To date (December 2019): **32 countries** including **11 ITC**, 4 NNC and 2IPC

WG1 and WG2 leaders are ECIs from ITC (see below)

## **c) Early Career Investigators (ECIs)**

We encourage ECIs through STSMs, TS and meetings, we also tried to provide leading position to young researchers (i.e. WG leadership).

- Ana Paula Santos (ITC, Portugal) was leading WG1 during the maternity leave of Katja Graumann (United Kingdom). We still need to have Ana Paula becoming a MC substitute in order to make the official change at the eCOST web site. Spanish CNC has been contacted and all administrative requests have been performed by Ana Paula.
- Martina Dvorackova (ITC, Czech Republic) will lead WG2 during the maternity leave of Stefanie Rosa (Sweden).

## **10. Follow-up of MoU objectives: progress report of working groups (Chair & WG leaders)**

The Chair revisited all the objectives. In order to achieve the objectives of the Action, these have to be kept in mind by all MC members and WG leaders.

- objectives 1, 9 and 10 have already been reached.
- objectives 2, 3, 5, 6, 7, 8 and 11 are well engaged.
- objectives 4, 12 and 13 have started but are not well advanced. To be focused in the next Grant Period

**To do:** The Chair will provide the two tables “Objectives” and “Deliverables” to MC members to add ideas or possible contributions.

### **Specific points:**

**Objective 2:** 3 specific goals were discussed:

- Generate standardized protocols will be discussed with Springer as INDEPTH members have published **27 protocols in Methods in Molecular Biology (MiMB)**, which are not yet freely accessible (no open access). A dedicated page on the web site is already available to host these protocols. **To do:** The Grant Holder Manager will investigate the cost of making MiMB protocols freely accessible (open access). WG5 leader (Aline Probst) will investigate alternative solutions such as collecting pre-prints, reformatting protocols or making lab protocols of INDEPTH members available through the website.

- MC members Dionisya Fasula (Cyprus) and Dragana Miladinovic (Serbia) belong to the **EPPN network** (<https://www.eppnetwork.com/>) devoted to phenotyping under stress. This network has developed standardized protocols. **To do:** Dionisya Fasula (Cyprus) and Dragana Miladinovic (Serbia) will investigate the possibility to link to the EPPN network pages to fulfill objective 2.
- Standardized protocols in plant 3D imaging: **To do:** Celia Baroux investigate the possibility to write a review on the pitfalls of 3D imaging, how to acquire a good image.

**Objective 3:** promoting Protein-Protein-Interaction (PPI) remains challenging. The Chair explains that the people who were active at the time of the project writing /submission are active in the Action. INDEPTH needs new leaders in this field to promote PPI. We propose to 3 types of actions to promote the achievement of Objective 3

- to **identify a new "leader"** for the PPI aspect. In the audience ~ 6 MC members and substitutes were involved in PPI and will come back to the Chair to express his/her interest to take this leadership. **To do:** the Chair will send a call to identify a PPI leader.
- to **organize a PPI workshop**. As for WG1 in bio-imaging could involve inviting people from IntAct, String or BioGrid to explain how to upload data). **To do:** Researcher from Poland should confirm their interest in organizing a workshop on PPI in the coming year.
- To **target some STSMs** focused on PPI. **To do:** the STSM coordinator should advertise targeted STSMs on PPI.

**Objective 4:** Perform analysis of the collected datasets” relies on the achievement of Objective 1 and 3.

**Objective 7 and 8:** synergies between model and crop species (Review WG3) and between academia and Industry (Workshop in El Escorial) are good example to achieve these two objectives.

- A **new workshop with industry** is expected in Eucapia and the Sunflower Conference. **To do:** Dragana Miladinovic organizes a new workshop to promote interaction with industry (EUCARPIA and/or The Sunflower Conference).
- A key meeting in the field is the Plant and Animal Meeting. **To do:** the chair propose to investigate the possibility to organize a **specific INDEPTH workshop** during this meeting (last chance is January 2021) with the help of our IPC partners from US (H. Bass, I. Meier, E. Richards).

**Objective 12 :** MC members were interested to learn more about ERASMUS+ exchanges and agreements.

- **To do:** the chair organizes a specific discussion on ERASMUS+.

**Objective 13:**

- **To do:** WG4 leader Stefan Grob proposes his help to collect plant Hi-C datasets that would be adapted for training issues.
- **To do:** Each MC member has to list how INDEPTH helps in providing material used for teaching (mutants, protocols, imaging, new techniques...).

TYPE OF OBJECTIVE	OBJECTIVE n°	DESCRIPTION	% PROGRESS
Research Coordination 1	Objective 1	Provide a <b>web site</b> and an on-line <b>open-access depository</b> for INDEPTH data sets;	76-100%
Research Coordination 2	Objective 2	<b>Generate standardized protocols</b> in 3D imaging of the nucleus (WG1), nuclear proteomics (WG2), chromatin domains (WG2), phenotyping during development & under stress conditions (WG3);	26-51%
Research Coordination 3	Objective 3	<b>Collect plant data sets</b> in 3D imaging of the nucleus (WG1), nuclear proteomics (WG2), chromatin domains (WG2), phenotyping during development & under stress conditions (WG3);	25-51%
Research Coordination 4	Objective 4	<b>Perform analyses using the collected datasets</b> to predict the nuclear protein interactome (WG4);	0-25%
Research Coordination 5	Objective 5	<b>Create new application tools</b> such as new softwares (WG1, WG4), new bioinformatic pipelines to predict Protein Protein Interactions (PPI) (WG4) and periodicity and distribution patterns (WG4);	26-51%
Research Coordination 6	Objective 6	Promote synergies between <b>model and cultivated</b> plant species;	51-75%
Research Coordination 7	Objective 7	Develop opportunities for <b>collaboration with industry</b> , foster the transfer of knowledge between model and cultivated species and creation of intellectual property in image analysis.	26-51%
Capacity Building 1	Objective 8	Promote sustainable interactions between industrial and public research with leading companies in microscopy, imaging software and plant breeding during <b>Teaching Schools (TS), meetings, Short Term Scientific Missions (STSM)</b> and round-table discussions	26-51%
Capacity Building 2	Objective 9	Welcome the participation of new Inclusiveness Target Countries (ITCs) and Near Neighbour Countries (NNCs) in INDEPTH activities;	76-100%
Capacity Building 3	Objective 10	Promote <b>gender equality</b> and women leadership in this exciting field of research;	76-100%
Capacity Building 4	Objective 11	Foster interdisciplinary training and career development for <b>Early Career Investigators (ECIs)</b> through their involvement in the organization of project activities and their participation in training events ( <b>TS and STSMs</b> );	26-51%
Capacity Building 5	Objective 12	Promote new <b>ERASMUS agreements</b> between partner universities;	26-51%
Capacity Building 6	Objective 13	Integrate knowledge obtained from the project in <b>Master and PhD training programmes</b> of the academic partner organizations.	26-51%

WG	DELIVERABLE N°	MONTH N°	MoU N°	Year/Month	expected dates	DESCRIPTION	Status
WG5	D01	6	D5.1	y1m6	june 2018	Publication of an article describing the INDEPTH COST-Action	Delivered
WG5	D02	6	D5.2	y1m6	june 2018	Functional and Implemented Website with project description, protocols, news letter ...etc.	Delivered
WG1	D03	12	D1.1	y1m12	décembre 2018	A review publication about "next challenges in plant microscopy"	Delivered
WG2	D04	18	D2.1	y2m6	june 2019	A review publication about the state-of-the-art to study "plant nuclear organization"	Delivered
WG3	D05	18	D3.1	y2m6	june 2019	A review publication about "chromatin dynamics during plant response to stress"	Delivered
WG2	D06	24	D2.2	y2m12	décembre 2019	Standardized protocols in "plant proteomics" available to the public and education programs	Not delivered but expected before the end of Action
WG4	D07	24	D4.1	y2m12	décembre 2019	Repository including INDEPTH 3D images and -omics data made publicly available	Delivered for images Canceled for omics
WG1	D08	30	D1.2	y3m6	June 2020	Standardized protocols in "plant sample preparation" deposited on INDEPTH Website; a multi-authored publication	Not delivered but expected before the end of Action
WG1	D09	30	D1.3	y3m6	June 2020	Standardized protocols in "plant 3D imaging"	Not delivered but expected before the end of Action
WG3	D10	30	D3.2	y3m6	June 2020	Standardized protocols in "plant phenotyping under stress"	??? To be discussed with WG3

## 11. Scientific planning (Chair, Vice-Chair & Core Group members)

### a) Scientific strategy (MoU objectives, GP Goals, WG tasks and deliverables)

The goals of the third Grant Period were partially achieved and have significantly improved to reach the INDEPTH objectives. We had 5 goals (GAPG).

**GAPG 1:** Publish a guideline for dataset submission to INDEPTH repository (define the minimal set of parameters to be used) as well as a list of tools to be used by the applicants of the Action (to provide standardised datasets).

- **Partially achieved:** WG1 with OMERO team has been organized in Lisbon (Sept 2019), a repository is available at FSU (USA) and connected with two other facilities at UCA (France) and Cyl (Cyprus). First datasets are available. A guideline has been written by H. Bass (FSU) but should be disseminated by WG1 leaders. Needs to define

the minimal set of parameters to be provided by image providers (i.e; a set of tag, a set of key pair-values...etc)..

**GAPG 2:** Collect datasets from WG1, 2 and 3 and make them available through Open source repositories and/or INDEPTH Website.

- **Partially achieved:** Achieved for WG1 (3D images of Nucleus) not for WG2 and WG3 because datasets are already in some databases such as GEO.

**GAPG 3:** Define a future reference standard in the field of “Plant Nuclear Organization” i.e. define a consensual concept of nuclear domains and methods.

- **Achieved:** a WG2 review is submitted to *Journal of Experimental Botany (JExpBot)* in Décembre 2019

**GAPG 4:** Define a future reference standard in the field of “chromatin dynamics during plant response to stress” i.e. define a conceptual framework about definitions, analyses and challenges; planned deliverables.

- **Achieved:** a WG3 review has been accepted in *JExpBot*

**GAPG 5:** Create a discussion platform between INDEPTH members and industrial representatives to promote collaborative opportunities and foster strategies for translational research on crop species;

- **Achieved** a WG3 workshop with industry has been organized by Dragana Miladinovic, Serena Varotton and Monica Pradillo during the main meeting at El-Escorial. Industrial partners: KWS SAAT SE & Co. KGaA (Germany), Sequentia Biotech (Spain) and BIOVEGEN (Spain). Minutes of this workshop will be made available. This document will make some recommendations and suggestions for INDEPTH members.

#### **b) Action Budget Planning: proposed WBP n°4**

Expected budget of ~120 000€ starting 1<sup>st</sup> May 2020 and ending 30<sup>th</sup> April 2021.

#### **c) Long-term planning (including anticipated locations and dates of future activities)**

- 1 main meeting (Portugal, Cyprus?) or 1 MC meeting in Brussels
- 2-4 workshops: PPI, interaction with industry, ERASMUS+, 3D bioimaging
- 2-3 Training schools: Imaging with Imaris (Organiser: Célia Baroux, together with Bitplane company, Switzerland), Omics analysis (Organiser: Moussa Benhamed, Aline Probst, France), Hi-C analysis (organizer: Hans Nützmann, UK).
- 2 Dissemination meetings: INC COST-Action, EUCARPIA or Plant and Animal Genome

#### **d) Dissemination planning (Publications and outreach activities)**

- ITC conference Grants should be more promoted (no request so far)
- 10 STSM Dissemination: open Access fees)

### **12. Requests to join the Action from:**

#### **a) COST countries**

One new request from a new ITC country (Moldova). An e-Vote has been organised and approved this new country.

**To do:** The Chair informs Prof Larisa Andronic from Moldova that she is a new MC member of INDEPTH.

**b) Institutions in Near Neighbouring Countries, International Partner Countries, and/or Specific Organisations: EU agencies, European RTD Organisation, International Organisations**

none

**13. Any Other Business**

WG leaders have the possibility to turn-over the leadership and promote new leaders from ITC and ECIs. For instance, new WG leader for WG1 from an ITC.

**14. Location and date of next meeting**

No location decided yet but possible location in ITC countries such as Cyprus or Lisbon were discussed.

**15. Summary of MC decisions (to do list)**

- **To do:** The Chair organizes an electronic vote in the coming week to approve the MC Minutes.
- **To do:** The Chair/GHM investigates possible Open Access fees, workshop , ITC conf. grants and dissemination meetings to spend the remaining budget of Grant period 3 (20k€)
- **To do:** The Chair/ GHM organize an electronic vote to decide the best scenario and location for the next main meeting
- The Chair submits the second progress report (**PR2**) by December 27<sup>th</sup>, 2019.
- Nomination of Ana Paula Santos as WG1 leader.
- Nomination of Martina Dvorackova as WG2 leader.
- **To do:** The Grant Holder Manager will investigate the cost of making MiMB protocols freely accessible (open access). WG5 leader (Aline Probst) will investigate alternative solutions such as collecting pre-prints and reformatting of protocols.
- **To do:** The Chair will provide the two tables “Objectives” and “Deliverables” to MC members to add ideas or possible contributions.
- **To do:** Dionisya Fasula (Cyprus) and Dragana Miladinovic (Serbia) investigate the possibility to link to the EPNN network pages to fulfill objective 2.
- **To do:** Celia Baroux investigates the possibility to write a review on the pitfalls of 3D imaging, how to acquire a good image to fulfill objective 2.
- **To do :** the Chair sends a call to identify a PPI leader.
- **To do:** Researcher from Poland should confirm their interest in organizing a workshop on PPI in the coming year.
- **To do:** the STSM coordinator advertises targeted STSMs on PPI.
- **To do:** Dragana Miladinovic organizes a new workshop to promote interaction with industry (EUCARPIA and/or The Sunflower Conference).
- **To do:** the chair proposes to investigate the possibility to organize a **specific INDEPTH workshop** during the Plant & Animal meeting (last chance is January 2021) with the help of our IPC partners from US (H. Bass, I. Meier, E. Richards).



- **To do:** the chair organizes a specific discussion on ERASMUS+ to fulfill objective 12.
- **To do:** WG4 leader Stefan Grob proposes his help to collect plant Hi-C datasets that would be adapted for training issues.
- **To do:** Each MC member has to list how INDEPTH helps in providing material used for teaching (mutants, protocols, imaging, new techniques...).
- **To do:** The Chair informs Prof Larisa Andronic from Moldova that she is a new MC member of INDEPTH.

## 16. Closing

The Chair thanks all the MC members for their attendance and active participation.