

# Report for evaluation of the Institute of Earth, Life and Environment, ILEE – 2018 to 2020 –

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# 1. Presentation of ILEE

To foster interdisciplinary research and collaboration, several research institutes were created at the University of Namur in 2017. Each of these institutes gathers various skills of the different research units to address a global topic. The Institute of Life, Earth and Environment (ILEE) focusses on the mechanisms of Life on Earth and its interactions with the Environment. Research conducted at ILEE aims at a better understanding of the fundamental processes that regulate life on earth. These involve the characterisation of anthropogenic pressures on the environment, including historical and socio-economic aspects. The search for sustainable alternatives to manage natural resources, to reduce pollution, to conserve and restore biodiversity are among the major objectives targeted by ILEE.

A strong asset of ILEE is the coalition of multiple disciplines offering completely new insights and interdisciplinary approaches on interactions of organisms, species and ecosystems being exposed to anthropogenic impacts. These range from natural sciences including biology, geology, chemistry and physics over social science disciplines such as geography to humanities with environmental history, history of art and archaeology, and law.

## 1.1. Research topics

ILEE combines a large panel of competences in fundamental, applied and social sciences enabling a significant contribution to understand the evolution of life. To face current and future environmental challenges, we search for sustainable solutions, integrating ecological, technological, socio-economic and historical/cultural perspectives. Eight major research topics have been identified:

The understanding of [→ \*Evolution, Adaptation and Biodiversity\*](#) is tackled with the combination of mathematical models, field data and experimental setups. A more mechanistic understanding of biological processes uses physiological, behavioural, proteomic and epigenetic indicators. Evolutionary processes, sexual and asexual reproduction are investigated at population level.

[→ \*Pollution and Environmental Toxicology\*](#) is among the most urging topics today. At ILEE, specialised instruments for molecular spectroscopy as well as bioinspired materials are developed to provide technological innovations. Aquatic organisms serve as bioindicators under natural or experimental conditions to study immune and organismic phenotype responses to stress.

The [→ \*Characterization and Management of Natural Resources\*](#) aims at a responsible use to guarantee their supply for future generations. Research focusses on the prospection of unrenovable geological resources (e.g. rare-earth metals) including their utilisation by humans over centuries, as well as the mapping and modelling of aquifer and karstic flow processes. Concerning renewable resources studies include fish stock assessments and restoration of aquatic ecosystems.

The concept of [→ \*Ecosystem services\*](#) (ES) fosters sustainable landscape management and planning to increase well-being of local actors. In order to achieve this, inclusive integrated valuation frameworks are developed combining different types of values (social, economic, biophysical), and include local stakeholders in a participatory way. A key focus at ILEE lies on the issue of social valuation of ES, assessing trade-offs and synergies between ES and actors to improve local ES governance.

Research on [→ \*Sustainable Plant and Animal Production\*](#) aims at developing alternatives to chemical, pharmaceutical and environmentally harmful products in agri- and aquaculture. Plant molecular studies focus on elicitor molecules that stimulate plant defences against both biotic and abiotic stress.

In aquaculture, immuno-stimulation methods are investigated to replace the use of antibiotics and chemicals. Plant oils are studied as substitutes for fish meal and fish oil.

→ [Environmental Impacts on Human Populations](#) include natural disasters or health risks and influence the distribution and dynamics of human populations, migration, and vulnerability of individuals. Innovative methods are used to capture the high complexity and integrated approaches to spatial issues in epidemiology.

→ [Environmental History and Law](#) focus on the perception of human impacts on urban and rural areas through urbanization, industrial exploitation and pollution as well as the history of the local products (“produits du terroir”). Research on environmental law concentrates on its beginnings and sources, exploring the mobilized principles and their development over the last decades.

→ [Environmental and Natural Resource Management in the South](#) describes the collaboration of members of ILEE with various partners located in Southern countries: Africa, Central and South-America and South-Eastern Asia.

## 1.2. Governance

The Institute is composed of three bodies: The Assembly of Members, the Steering Committee and the President.

The Assembly is made up of the affiliated members of the Institute. Membership of the Institute is voluntary, individual, and possible at 100 % or 50 %, in case of affiliation to two research institutes of UNamur. Members are academic and scientific staff (permanent and non-permanent) or administrative and technical staff of UNamur. Associated Members are external to UNamur, but contribute to ILEE's research programmes.

The Steering Committee is composed of the President and five members of UNamur who represent the exact sciences, humanities and social sciences involved in the institute. It has been elected in 2017 and consists of the President Patrick Kestemont (Biology, URBE), Johan Yans (Vice-President, Geology), Muriel Lepère (Physics), Nicolas Dendoncker (Geography), Mathieu Piavaux (Art History and Archaeology) and Frédéric Silvestre (Biology). During the annual member assembly in 2020 (subsequent to the annual ILEE Research Day), the actual steering committee was confirmed. The steering committee meets at least four times per year to decide on scientific activities and organisation. It is also responsible for the use of institute's budget such as the acceptance of travel or project grants or any other financial support demanded (e.g., contribution to conference organisation, invitation of external researchers, equipment acquisition).

In 2018, Carolin Mayer was engaged as scientific manager who supports the Steering Committee in administration and communication. She is responsible for the organisation of all internal activities, email correspondence within the institute, valorisation of scientific research via dissemination of newsletters and social media, management and update of a website, etc. (see Internal / Institutional activities).

### 1.3. Members

#### *General description*

Affiliations to a research institute are possible at 100, 50 or 0 %. At the official launch of the institute in 2018, 95 scientific collaborators and 18 administrative and technical staff of the University of Namur were affiliated to ILEE (not all technical staff is affiliated to an institute). Two external members were further affiliated, summing up to 115 members for the Institute of Earth, Life and Environment. This figure fluctuated only slightly from year to year, mostly due to PhD students that end or start a thesis. Today (November 2020), 99 researchers and 13 technical and administrative staff are affiliated to ILEE.

The large majority (51.5 %, Figure 1) of the scientific staff belongs to the Department of Biology (51, from two research units: URBE and URBV<sup>1</sup>), followed by the Department of Geology (16), Geography (15), History, notably PolleN<sup>2</sup> (6), Physics (5), Chemistry (2), Art History and Archaeology (3; HAA in Figure 1) and finally one researcher from the Faculty of Law.

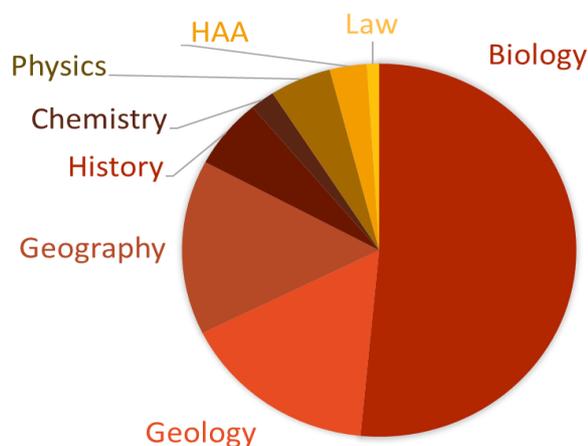


Figure 1: Distribution of different disciplines present within ILEE

Two thirds (67 %, 66 persons) of the scientific staff were 100 % affiliated to ILEE, while the remaining researchers were also affiliated at 50 % to other research institutes:

Espace philosophique de Namur (ESPHIN, 1), Namur Research Institute for Life Sciences (NARILIS, 7), Namur Institute for Complex systems (naXys, 10), Namur Institute of Structured Matter (NISM, 2), Patrimoines, Transmissions, Héritages (PaTHs, 3), and TRANSITIONS (10). The proportion of affiliations has implications regarding the yearly allowance ILEE receives from UNamur. In return, grants given by ILEE to its members are bisected for “50 % - members”.

One-fifth of the scientists is academic staff holding permanent positions (Table 1). Of 51 PhD students, ten are actually engaged as teaching assistants while 41 hold a grant. Another 18 scientists are engaged as Post-docs (see Table 1 for further details).

Most of the administrative and technical staff are technicians (9) working in the laboratories. The remaining four work in management, service and administrative positions.

#### *Gender statistics*

The proportion of female scientific staff was 38 % in 2018 and remained stable until today (Table 1). This is slightly below the general proportion at UNamur (~41 %) <sup>3</sup>, as well as the proportion of women among researchers in the higher education sector in Belgium in 2015 (41,6 %) <sup>4</sup>. The reason is probably

<sup>1</sup> URBE: Unité de recherche en biologie environnementale et évolutive

URBV: Unité de recherche en biologie cellulaire végétale

<sup>2</sup> PolleN: Pôle d'histoire et de sociologie environnementales de l'Université de Namur

<sup>3</sup> Rapport sur l'état de l'égalité de genre à l'Université de Namur 2018-2019: [link](#)

<sup>4</sup> She figures 2015: [link](#)

*Table 1: Number of scientific staff according to the different status grouped by gender*

	Total	Women	Men	% Women
Academics	18	5	13	27.8
Permanent Scientists	2	1	2	50.0
Post-doc	18	6	12	33.3
PhD assistant	10	3	7	30.0
PhD grant holder	41	17	24	41.5
Assistant	1	0	1	0
Master scientist	1	1	0	100
Other	8	5	3	62.5
<b>Total</b>	<b>99</b>	<b>38</b>	<b>62</b>	<b>38.4</b>

the large share of natural sciences within ILEE. In general, a low proportion of female researchers (23 % in Belgium in 2015)<sup>4</sup> is working in this sector. However, within ILEE, a higher proportion of females (27.8 %) belong to the academic staff with a permanent contract compared to UNamur in 2019 (22.2 %).

#### *Level of employment*

Today, over 75 % of the scientific staff work fulltime and another 5 % work at 80 %. Much more women (26 %) work part time than men (3 %), which is usually the case in Belgium<sup>5</sup>.

### 1.4. Budget

Within UNamur, ILEE is considered to be a large institute and receives an annual fee of 25.000 €. Further, the number of members as well as the number of projects and completed PhD theses account for a defined amount of money allocated to the institute by the university. During 2017, the launch of all research institutes of UNamur, ILEE received already his budget, but had hardly expenses. Table 2 shows the receipts and expenses during the past three years.

<sup>5</sup> The Institute for the equality of women and men: [link](#)

Table 2: Budget ILEE 2018-2020

Balance 2017		69.612,50 €
Income 2018	Annual fee & N° of members	46.200,00 €
	Theses & projects	12.250,00 €
	Budget Fellow NARC, F. De Laender	15.000,00 €
<b>Budget for 2018</b>		<b>143.062,50 €</b>
<b>Expenses 2018</b>		
Staff	Scientific manager	29.090,28 €
Diverse	ALTERNET, teambuilding, IT, workshop	7.201,78 €
Travel grant	1	500,00 €
<b>Subtotal expenses 2018</b>		<b>36.792,06 €</b>
<b>Balance to be carried over:</b>		<b>106.270,44 €</b>
Income 2019	Annual fee & N° of members	46.362,50 €
	Theses & projects	16.500,00 €
<b>Budget for 2019</b>		<b>169.132,94 €</b>
<b>Expenses 2019</b>		
Staff	Scientific manager	30.947,67 €
Diverse	ALTERNET, flyer, Research Day, Teambuilding	5.707,36 €
Travel grant	11 out of 15	6.753,27 €
NARC expenses	Invited speakers	430,70 €
<b>Subtotal expenses 2019</b>		<b>43.839,00 €</b>
<b>Balance to be carried over</b>		<b>125.293,94 €</b>
Income 2020	Annual fee & N° of members	46.750,00 €
	Theses & projects	17.750,00 €
Theoretical sum 2020		64.500,00 €
Effective sum (-10%)	All budgets reduced by 10%	56.809,00 €
<b>Budget for 2020</b>		<b>182.102,94 €</b>
<b>Expenses for 2020</b>		
Staff	Scientific manager excl. Dec 20	33.691,18 €
Diverse	ALTERNET, Research Day, sandwiches	3.796,50 €
Travel grant	5	2.420,14 €
Conference participation	Stone by stone	2.000,00 €
<b>Subtotal expenses 2020</b>		<b>41.907,82 €</b>
<b>Balance to be carried over</b>		<b>140.195,12 €</b>
<b>Expenses foreseen in 2021</b>		
Staff	Scientific manager	~35.000,00 €
Diverse	ALTERNET, Research Day, Teambuilding	5.500,00 €
ILEE travel grant		9.000,00 €
ILEE project grant	4 projects @ 15.000€	60.000,00 €
<b>Rough estimation expenses 2021</b>		<b>111.000,00 €</b>

## 2. Output

### 2.1. PhD Theses

From 2018 to 2020, 28 PhD candidates defended their thesis and received a doctoral degree. According to the share of the discipline within the institute, over half of them are biologists. Find here in chronological order the list of the theses defended, including the candidate, title, supervisor, and a link to a short summary:

1. Élodie FALISSE, 02/02/2018, supervisor Frédéric SILVESTRE, Title: Zebrafish (*Danio rerio*) early-life stage exposure to triclosan: immediate and delayed effects. [link](#)
2. Kevin TROCH (Université de Lille), 02/02/2018, supervisor Isabelle PARMENTIER, Title: "Ne pas grever l'avenir au bénéfice du présent". Une histoire environnementale de l'extraction du charbon de la fin du 18e siècle à l'Entre-deux-guerres : un développement non soutenable. L'exemple du Couchant de Mons et du Valenciennois. [link](#)
3. Sarah VRAY (UMons), 29/03/2018, supervisor Nicolas DENDONCKER, Title: Cent ans de déclin des bourdons en Belgique : influence du climat et de l'occupation du sol. [link ILEE](#), [link](#)
4. Benoît BERNARD, 26/04/2018, supervisor Patrick KESTEMONT, Title: Physiological response of smolts from two strains of Atlantic salmon, *Salmo salar* L., to a temperature increase on their migratory route. [link](#), [link ILEE](#)
5. Anne-Sophie VOISIN, 02/05/2018, supervisor Frédéric SILVESTRE, Title: Delayed effect of early-life exposure to 17- $\alpha$ -ethinylestradiol on the DNA methylation landscape, proteome and physiology of the self-fertilizing mangrove rivulus *Kryptolebias marmoratus*, [link](#), [link ILEE](#)
6. Nicolas DEBORTOLI, 04/05/2018, supervisor Karin VAN DONINCK, Title: On the evolutionary dynamics of *Adineta vaga* (Bdelloidea). [link ILEE](#), [link](#)
7. Adrien LATLI, 21/09/2018, supervisor Patrick KESTEMONT, Title: Diminution des ressources planctoniques et artificialisation de l'habitat. Quelles conséquences sur le fonctionnement des communautés aquatiques ? [link ILEE](#), [link](#)
8. Khuyen TRINH DINH, 11/10/2018, supervisor Patrick KESTEMONT, Title: Comparative immunomodulatory responses and disease resistance of rainbow trout juveniles fed selected nutritional compounds. [link ILEE](#), [link](#)
9. Leon MARSHALL, 26/10/2018, supervisor Nicolas DENDONCKER, Title: Wild bee diversity across space and time: the role of land use/land cover and climate. [link ILEE](#), [link](#)
10. Lorraine DEWAIDE, 06/12/2018, supervisor Vincent HALLET, Title: Hydrodynamics of solute transport in karst conduits with contrasted geometries: karstogenesis description and tracer tests modelling in the Waulsortian mudmounds (Furfooz, Belgium). [link ILEE](#), [link UNamur](#)
11. Sofia COSTA SANTOS BALTAZAR, 21/01/2019, supervisor Nicolas DENDONCKER, Title: Pratiques et dynamiques de gestion in situ de la diversité cultivée des céréales panifiables : une recherche-action participative en Wallonie et en Andalousie, [link ILEE](#), [link UNamur](#)
12. Jonathan DE RAEDT, 07/03/2019, supervisor Ferderik DE LAENDER, Title: The combined effect of chemical stress and dispersal on the diversity and productivity of marine micro-algae communities. [link UGhent](#)
13. Aboubacar SOURABIE, 20/03/2019, supervisor Patrick KESTEMONT, Title: Valorisation des sous-produits agro-industriels du Burkina Faso dans l'alimentation du poisson-chat africain *Clarias gariepinus* et impacts sur la nutrition protéique et lipidique, [link ILEE](#), [link UNamur](#)

14. Kerby ALVAREZ, 05/04/2019, supervisor Isabelle PARMENTIER, Title: A History of Earthquakes in the Luzon Island, Philippines during the 19th and 20th Centuries: Historical seismology, bureaucratic responses, and socio-cultural interpretations of disasters, [link UNamur](#)
15. Augustin DEKONINCK, 29/08/2019, supervisor Johan YANS, Title: Constraints on the formation and the timing of supergene manganese deposits: new insights from geodynamics in Europe and North Africa. [link ILEE](#), [link UNamur](#)
16. Emmanuel TINTI, 29/11/2019, supervisor Eric PERPETE, co-supervisor Patrick KESTEMONT, Title: Caractérisation de désaturases et d'élongases impliquées dans le métabolisme lipidique de la perche commune (*Perca fluviatilis*). [link ILEE](#), [link UNamur](#)
17. Sylvain LEONIS, 11/12/19, supervisor Muriel LEPERE, Title: Etude par spectroscopie diode-laser de l'élargissement collisionnel de raies du chlorométhane: des basses jusqu'aux hautes températures. [link ILEE](#), [link UNamur](#)
18. Nicresse GUEDEGBA, 18/12/2019, supervisor Patrick KESTEMONT, Title: Effets de l'exposition ex situ et in situ des juvéniles du tilapia du Nil *Oreochromis niloticus* à des pesticides utilisés dans le traitement phytosanitaire du cotonnier au Bénin via l'approche multi-biomarqueurs. [link ILEE](#), [link UNamur](#)
19. TRUONG Quynh Nhu, 19/12/2019, supervisor Patrick KESTEMONT, Title: Immunomodulatory potential of different herbal plant extracts on striped catfish (*Pangasianodon hypophthalmus*): in vitro and in vivo approaches. [link ILEE](#), [link UNamur](#)
20. Lola RICHELLE, 20/12/2019, supervisor Nicolas DENDONCKER, Title: De la fertilité des sols à la santé de la terre; retour sur un processus d'apprentissage collectif visant l'évaluation de la santé des sols cultivés en agriculture paysanne. [link ILEE](#), [link UNamur](#)
21. Véronique BECKERS, 17/01/2020, supervisor Nicolas DENDONCKER, Title: High spatial resolution agent-based modelling at the country scale: an application of farming dynamics in Belgium, [link ILEE](#)
22. Thi Mai NGUYEN, 18/02/2020, supervisor Patrick KESTEMONT, Title: Influence of the content in dietary polyunsaturated fatty acids on lipid metabolisms and immune responses of common carp (*Cyprinus carpio*) - in vivo and in vitro approaches, [link ILEE](#), [link UNamur](#)
23. Wouter REYNS, 20/03/2020, supervisor Frederik DE LAENDER (& François Rineau, UHasselt), Title: Predicting the effects of climate change on C sequestration by healthlands: the role of multi-trophic interactions between soil organisms, [link ILEE](#)
24. William RIGUELLE, 02/09/2020, supervisor Isabelle PARMENTIER (& Silvia Mostaccio, UCLouvain), Title: L'homme et la ville par le prisme de la bête. L'animal comme marqueur identitaire et révélateur de la gestion, des activités et des espaces urbains (Pays-Bas méridionaux et principauté de Liège, XVIIe-XVIIIe siècle), [link UCLouvain](#)
25. Alessandra CARION, 09/09/2020, supervisor Frédéric SILVESTRE, Title Characterization of the brain molecular bases of personalities and assessment of their developmental plasticity in response to environmental stressors using an emerging model fish species, the mangrove rivulus, *Kryptolebias marmoratus*, [link ILEE](#), [link UNamur](#)
26. Michèle VERHAERT, 09/09/2020, supervisor Johan YANS, Title: Characterization and (U-Th-Sm)/He dating of Moroccan supergene ore deposits. New insights to unravel the periods and potential causes of weathering processes, [link ILEE](#), [link UNamur](#)
27. Sébastien BAEKELANDT, 16/09/2020, supervisor Patrick KESTEMONT, Title: Fish immunity: modulation by the light environment and the melatonin hormone in a percid fish, the pike-perch, [link ILEE](#), [link UNamur](#)

28. Jürg SPAAK, 26/11/2020, supervisor Frederik DE LAENDER, Title: Reinterpretation of niche and fitness differences improves our understanding of species coexistence, [link ILEE](#), [link UNamur](#)

## 2.2. Master theses

Between 2018 and 2020, 66 master theses have been (are still) supervised by members of ILEE: 33 in Biology, 16 in Geology, 6 in Geography, 7 in History (note that there is no master programme at UNamur in Geology, Geography, and History; thus, the latter theses have been defended at other universities) and 4 in Chemistry.

## 2.3. Prizes and awards

Since the creation of ILEE, several members have received prizes or were awarded for their outstanding science, outreach activities or other. In 2018, the PhD candidate in **Geology, Lorraine Dewaide**, received a Bourse Ernest Dubois, that is assigned to young researchers working on issues related to water resources. **Professor Frederik De Laender** was nominated as "NARC Fellow 2018" (Namur Research College) by the UNamur Board of Directors (evaluated by independent experts), a grant to researchers with a high-level research CV, who have recently received a prestigious award or funding. **Professor Pierre Van Cutsem (Biology, URBV)** was nominated « Namurois de l'année 2019 » in the category "Sciences/Humanities" by the Namurian magazine *Confluent*. As such, he was honoured for his 40-year career on (among others) the plant's defence mechanisms. The PostDoc researcher belonging to his team, **Geraldine van Aubel**, received a doctorate award by Phytofar, the Belgian Association of the plant protection products industry, for her thesis on the mode of action of COS-OGA, a new class of elicitor of innate plant immunity (2019). **Professor Karine Van Doninck (Biology, URBE)**, was awarded the prize ISTD Fonds Wernaers 2019 for media contributing to the development of interest in scientific culture. Together with the **artist Gerlando Infuso** she had conceived a stop motion animated film illustrating the project "RISE - Rotifer in Space" to the general public. Another award linked to this project was given by Innovatieve partnerprojecten (Flanders, 2019) to **Karine Van Doninck** in collaboration with the visual **artist Angelo Vermeulen** for the creation « Engines of Eternity » for/in space. She was further invited in 2019 together with 11 other women "*dont le parcours professionnel mérite d'être mis en valeur*", for a lunch with the Majesty, the King and the Queen of Belgium, in honour of the International day of women. **Valentine Chapelle (Biology, URBE)**, was one of the four final laureates of the *Prix Adrien Bauchau edition 2019*. The prize rewards the best master theses in the field of Biology of organisms and ecology. **Professor Frederic Silvestre (Biology, URBE)** received a FNRS research grant for a 6-months sabbatical leave at UC Davis in 2020. During the International Annual Meeting of the Society of Family Planning, the poster of **Professor Patrick Kestemont (Biology, URBE)** with the title: "The potential environment impact of estetrol, a native estrogen in development for oral contraception" was among the highest scored posters in 2020 and, therefore, eligible to receive an award.

## 2.4. Publications

Between beginning of 2018 and November 2020, members of ILEE published 200 articles or book chapters (2018: 77, 2019: 71, 2020: 52) in various international and national journals. The large majority (179) was published in peer-reviewed journals. Quite a number of these journals are among the highest ranking in natural sciences such as Science and Nature. Article and author metrics are common for the natural sciences, but not for humanity sciences where the culture of publication is

completely different. Nevertheless, since the majority of researchers stem from natural sciences, some metrics for these members plus the Geographers and their publications will be presented here.

For 64 and 65 manuscripts that were published in 2018 and 2019, respectively, article metrics are available: according to Crossref, these were cited on average 8.5 (2018) and 7.4 (2019) times. GoogleScholar usually gives higher citation rates, namely 11.1 (2018) and 9.2 (2019) times until November 2020. For articles published in 2020, it is too early to calculate citation metrics. The H-index of ILEE's principal investigators ranges between 45 and 7, with a mean of 22 (9 out of 14 researchers have a H-index that is 20 or higher). The institutes' H-index is 16, as indicated on the research portal of UNamur. This includes also publications before 2018. The most influential paper (Kraemer et al., 2019) with Catherine Linard (Geography) as co-author was published in Nature Microbiology and has already been cited 120 times. Another three articles have been cited 40 times and more (Barnaud et al., 2018; Merckx et al., 2018; Legradi et al., 2018). 14 publications have at least been cited 15 times up to date. Three quarters of all articles published between 2018 and 2020 were published in high impact journals (Q1 journals, Figure 2), another 21% were published in Q2 journals. Less than five percent of all papers were published in lower impact journals (Q3 and 4). This demonstrates the high quality of research conducted y researchers within ILEE.

Find all publications associated to ILEE under “research output” here:

<https://researchportal.unamur.be/en/organisations/institute-of-life-earth-environment/>

For further information on the publications of ILEE members, including short summaries of all articles published since 2018, please visit <https://ilee.unamur.be/publications>.

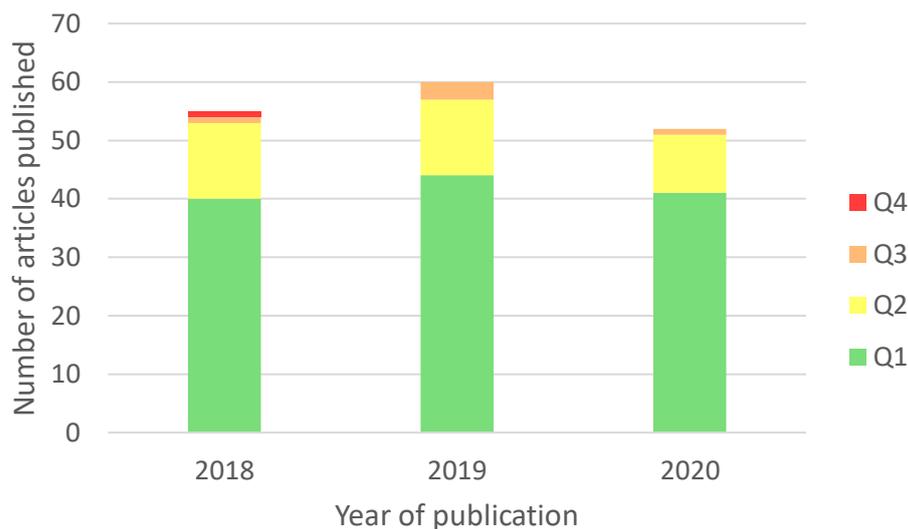


Figure 2: Number of articles published in high (Q1 and 2) and low (Q3 and 4) ranking journals. Source for journal ranking: SCImago, (n.d.). SJR — SCImago Journal & Country Rank [Portal]. Retrieved Date you Retrieve, from <http://www.scimagojr.com>

## 2.5. Projects and external funding sources

During the past three years, 91 projects were running within ILEE, including doctoral projects receiving external funding. Half of them was supported by regional sources, especially via the FSR-FNRS, funding almost a third (27%) of all projects (Figure 3). The other 24% received funding mainly from the SPW (Service Public de Wallonie) and the FWB (Fédération Wallonie-Bruxelles). Federal sources (mainly ARES programmes - Académie de recherche et d'enseignement supérieur) and international programmes (like EU, ERASMUS and ESA) finance each 17-18% of all projects.

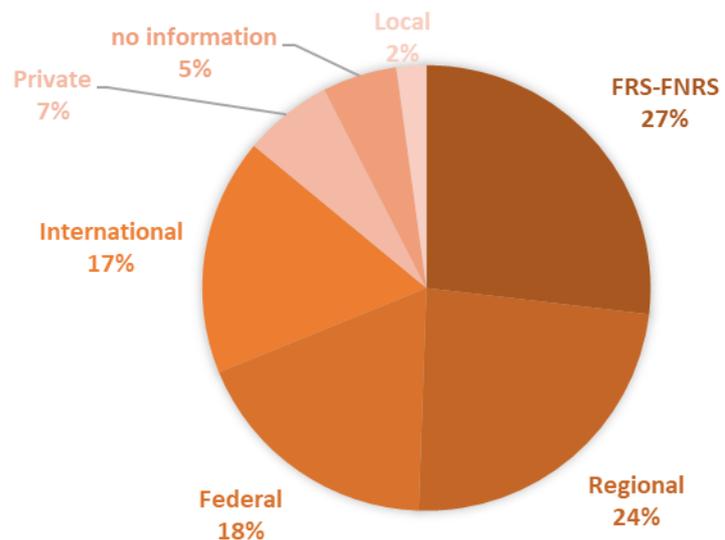


Figure 3: Sources for project funding

Local (internal) and private funding play a minor role with regards to project numbers. Nevertheless, they remain important sponsors to pay for PhD and Postdoc projects and guarantee teaching at UNamur via PhD Assistants. While 33 projects ended during 2018 and 2019, 27 new projects were launched by members of ILEE in the course of 2019 and 2020.

**Interdisciplinary projects within ILEE** still remain the exception, but the institute prepares the ground to stimulate interdisciplinarity with correspondent funding opportunities (see 3.4 and also *Fehler! Verweisquelle konnte nicht gefunden werden.*). One common project of the Unité de recherche en biologie environnementale et évolutive (URBE, Biology) and the Unité de Chimie Physique Théorique et Structurale (UCPTS, Chemistry) was the thesis of Emmanuel Tinti, supervised by Eric Perpète and Patrick Kestemont on the lipid metabolism of the common perch (*Perca fluviatilis*). Three common publications resulted from this project (Geay et al., 2016b,a; Tinti et al., 2019).

Mathieu Piavaux (History of Art and Archaeology) and Johan Yans (Geology) had a common project on the origin, spread and use of “Lorraine limestones” in the Middle Ages already before 2018. Three articles were published (Morel et al., 2012; Lecuit et al., 2018; Piavaux et al., 2019) and several communications were presented at international conferences. Both intend to continue this fruitful collaboration with the support of an ILEE project grant (see 3.4).

**Collaborations between ILEE and other research institutes of UNamur** exist, e.g., with Narilis (Namur Research Institute for Life Sciences) for projects on rotifers. A popular example is the RISE – Rotifers in SpacE – project, where the LEGE, Laboratory of Evolutionary Genetics and Ecology (with Principal Investigators Karine Van Doninck and Boris Hespeels) and LARN, Laboratory of Analysis by Nuclear Reaction (PI: Stéphane Lucas and Anne-Catherine Heuskin) from UNamur collaborate with SCK CEN, the Belgian Nuclear Research Centre (Sarah Baatout and Bjorn Baselet). A first article was published end of 2020 (Hespeels et al., 2020), yet there are more to follow in the near future. Another example is the project BEST (Bdelloid Extreme Stress Tolerance), which uses bdelloid rotifers as a model

organism to understand extreme stress tolerance and is a collaboration of Karine Van Doninck and Florence Chainiaux Debacq from Narilis.

More frequent are **interdisciplinary projects with external or international partners**. Members of ILEE participate in large projects coordinated by several partners from different universities, research institutes, private companies in Belgium and Europe. For example, many projects financed through ARES-CCD or EU programmes are interdisciplinary. Such programmes are of course very interesting and lucrative. Current funding patterns promote such large consortia of very different partners from different institutions and /or countries. In fact, it is easier to get funding for international projects combining different disciplines than for interdisciplinary projects within the same university/research institute. Thus, the inhibiting factor of interdisciplinarity within the same institution lies in current funding schemes that rather punish the collaboration within a university in demanding external, often international partners. In addition, calls often still remain monodisciplinary or at most complementary in their approach but do not aim at interdisciplinarity. ILEE is trying now to help settle such inner-institutional projects with the newly created ILEE project grant (see below), which should further stimulate inter-institutional projects within UNamur.

Find a complete list of projects associated to ILEE here:

<https://researchportal.unamur.be/en/organisations/institute-of-life-earth-environment/>

## 2.6. Mobility in

UNamur and ILEE are attracting scientists from all over the world. Between 2018 and 2020, 72 researchers came from 26 different countries to conduct research within ILEE (Table 3). Most of them came from Vietnam (10), France (8) and the Democratic Republic of the Congo, DRC (8). This is mainly a result of the close cooperation of Patrick Kestemont with several universities in Vietnam (University of Can Tho, Hanoi University, etc.) and close connections of Isabelle Parmentier to institutes in the DRC. Other frequent countries of origin were Tunisia (15 years of fruitful collaboration with Johan Yans), Benin (especially within the AquaTox Benin project, led by P. Kestemont) and the Philippines. The researchers either came for single research stays or to conduct their PhD theses part time in Belgium.

Table 3: Country of Origin of researchers visiting ILEE from 2018-2020

Country of origin	Involved ILEE members	Number of visiting scientists
Vietnam	Kestemont	10
Democratic Republic of the Congo	Kestemont, Parmentier	8
France	De Laender, Kestemont, Lepère, Parmentier, Silvestre, Van Doninck	8
Tunisia	Kestemont, Silvestre, Yans	5
Benin	Kestemont	5
Philippines	Hallet, Henry, Parmentier	4
India	Kestemont, Van Doninck	3
Romania	Henry	3
Great Brittan	De Laender, Dendoncker	3
Spain	De Laender, Dendoncker, Silvestre	3
Haiti	Henry	3
Algeria	Perpète, Yans	2
Rwanda	Henry, Kestemont	2
Madagascar	De Laender	2
Senegal	Linard	1
Netherlands	De Laender	1
Bangladesh	Kestemont	1
Burundi	Henry	1
Guinea	Yans	1
Japan	Van Doninck	1
Switzerland	De Laender	1
Burkina Faso	Kestemont	1
Germany	Linard	1
USA	Linard	1
Morocco	Kestemont	1

## 2.7. Mobility out

Besides frequent trips to international conferences (especially to the USA, Europe, Northern Africa), 13 members of ILEE travelled to diverse destinations for short- or long-term research stays in cooperating laboratories or for field work abroad, mainly in France, the USA and Africa. See Table 4 for more details.

Table 4: Destinations for research stays of ILEE members

Destination	Involved ILEE member	Frequency
Vietnam	Kestemont	6
France	Carion, Hallet, Verhaert, Yans	5
Morocco	Yans	4
USA	Chapelle, Silvestre	3
Switzerland	Perpète	3
Italy	Yans	3
Senegal	Bihin, Linard	2
Belize	Chapelle, Silvestre	2
Philippines	Henriet, Henry	2
Benin	Kestemont	2
Tunisia	Yans	1
Japan	Van Doninck	1
Haiti	Henry	1
Sweden	Begin	1
Rwanda	Kestemont	1
Romania	Henry	1
Philippines	Hallet	1

## 3. Internal / Institutional activities

### 3.1. Communication & Visibility

#### *Email & social media*

All members of ILEE are informed via email about the institute's activities, call of proposals, conferences, prizes, webinars, etc. The online programme used to create and distribute the emails and manage the audience is Mailchimp.

In June 2018, ILEE launched its own Facebook and Twitter account, mainly for sharing and spreading similar information about the institute's life as found in the newsletters and for sharing information about UNamur, environmental science, events from funding agencies, conferences, call for applications etc. that seems relevant for ILEE members. Both accounts have over 50 followers and achieve on average < 50 interactions per week with an upward trend. In October 2019, an Instagram account was further added with 42 followers to date.

#### *Website & Flyer*

A website was created at the beginning of 2018 that describes the institute and the different research topics investigated. All events and newsletters of ILEE are displayed, the Facebook and Twitter accounts are embedded. From 2016 on, all publications of ILEE members are listed, grouped under different research topics, including links to the original publications. For the publications published in

2018 and after, short summaries are provided (as they appear in the newsletters). Further, all research projects and a complete member list with contact details can be found. [Link](#)

A flyer representing the institute with its research topics was developed by the graphical service of UNamur (Laurence Anciaux) and printed for handout in early 2019. [Link](#)

### *Newsletter*

In March 2018, the first newsletter of the institute was published, followed by a new issue every two months. Due to its success regarding information communicated by the researchers to be included, its frequency of publication was increased to one newsletter every month since September 2019 (with a pause each year during the summer months July and August). The newsletters communicate new publications, projects, patents, etc.; participation of ILEE members at conferences, missions, trainings or fieldwork, workshops; announcements of events, seminars, social gatherings; introduction of new colleagues; appearance of ILEE members in the media. [Link](#)

## 3.2. Scientific networking

### *Kick-off meeting & workshop*

On June 11<sup>th</sup> 2018, the first meeting of all members of ILEE was held at the Business & Learning Center of UNamur. On the programme was at first a general introduction to the institute given by its president, Patrick Kestemont. Thereafter, the different research topics were exposed by the principal investigators. One could gain detailed insights into several projects via 20 posters, that had mainly been produced by PhD students and PostDocs. Two workshops were organised in the afternoon: a discussion of the challenges of interdisciplinary projects with Prof. Edwin Zaccai (ULB) as invited speaker; the other one giving the opportunity to (young) scientists to express their expectations versus the institute, animated by Anne-Catherine Lahaye (Oselacom). About 70 members participated in this kick-off event. [Link](#)

### *ILEE Research Day*

Since 2019, ILEE holds an annual research day where researchers present their actual work to all ILEE members. The stage is given expressively to young scientists to present their projects and practice presentation skills in English. On the programme are regular talks of 15 min plus 5 min discussion alternating with short teasers of 5 min to quickly introduce a poster that is displayed at the same time and can be consulted for more details during a coffee or lunch break. In 2020, one could further prepare a short video as presentation form. The mixture of topics and of different presentation styles is much appreciated by the audience. Two awards are offered (a book voucher of 100 €), one for the best oral and one for the best poster presentation. These are determined by a jury, composed of 5-7 professors or Postdocs that evaluate the content, the slides and interpretation of a presentation.

The ILEE Research Day 2019 took place on February 26<sup>th</sup> held at the Business & Learning Center of UNamur. More than 50 members listened to 13 inspiring talks stemming from the different disciplines, as well as two talks explaining the possibilities of international mobility programmes. Winners of the day were Alessandra Carion (URBE, Biology) for her inspiring presentation on the personality of fish and Augustin Dekoninck (Geology) for his poster teaser about the importance of geological processes generating manganese. [Link to the event](#)

On February 18<sup>th</sup> 2020, about 50 members came together at the Bourse of Namur. Two external speakers had been invited to give key note talks: Sébastien Viscardy from the Royal Belgian Institute

for Space Aeronomy (BIRA-IASB) and Gauthier Chapelle, an independent researcher. Fourteen talks were given by the doctoral students and postdoctoral researchers within ILEE. Camille Carpentier (URBE, Biology) won the award for the best oral presentation and Alice Cousin (URBV, Biology) for the best poster teaser. [Link to the event](#)

The scientific presentations are followed by the annual general assembly. ILEE's president, Patrick Kestemont sums up the institutions' facts for the past year, i.e., activities and events, PhD defences, publications, including an overview on the account listing receipts & expenditures, etc. and gives an outlook for the following year.

#### *ILEE Lunch seminar*

In October 2018, the first lunch seminar took place, a regular seminar which is organised once per month. Sandwiches for all participants are offered by the institute. For young researchers, this is another opportunity to train their presentation skills and exercise themselves in English, which is the preferred language. For project leaders or professors, the seminar offers another platform to present their research in detail to ILEE members. Further, exceptional lunch seminars are organised to take advantage of external scientists that visit UNamur Table 5. Another methodological seminar was organised on the application of GIS programmes and their use for data analysis and illustration. Members of the URBE unit presented their problems encountered with GIS while the Geographers provided hints and tips for appropriate solutions. The lunch seminar is thus a flexible and useful gathering to inform, exchange, learn about and from each other. It usually attracts between 10 and 30 participants from different laboratories. This is already quite a success seen that scientists are usually drowned by meetings and seminars on project, laboratory, faculty or department level. Due to the sanitary crisis, only two seminars were held in 2020.

*Table 5: List of ILEE lunch seminars*

Date	Speaker	Title	Number of participants
02.10.2018	Mathilde Macaux (History of Art and Archaeology)	Adaptative Reuse of Rural Monastic Sites in Belgium in the XIXth Century (1783-1914)	25
	Alexandre Erraud (Biology, URBE)	Évaluation de l'intégrité de l'ADN spermatique chez les crevettes Palaemonidae le long du continuum estuaire / littoral de la Seine	
06.11.2018	Sébastien Dujardin (Geography)	RespirIT: Assessing spatio-temporal relationships between respiratory health and biodiversity using individual wearable technology	18
	Lorraine Dewaide (Geology)	Hydrodynamic of solute transport in karst conduits with contrasted geometries. The case study of a heterogeneous karst system in the Waulsortian mudmounds (Furfooz, Belgium)	
04.12.2018	Sophie Moreaux & Géraldine Van Aubel (URBV, Biology)	Oligosaccharides as plant protection tools: probing the mode of action and the efficacy in vitro	21

Table 5 continued.

Date	Speaker	Title	Number of participants
	Martin Vastrade (Biology, URBE)	Asexuality and invasiveness in <i>Corbicula</i> mussels	
08.01.2019	Hossain Sakhawat (URBE, Biology)	Studies on the nucleotide nutrition and development of functional feeds for cultured marine species	27
	Xavier Thunis (Faculty of Law)	Compensation for environmental damage	
05.02.2019	Antoine Wittorski (URBE, Biology)	The turquoise killifish ( <i>Nothobranchius furzeri</i> ): a new model in ecological sciences.	15
	Kerby Alvarez (History, PolleN)	A History of Earthquakes in the Phillipines: Cases of Earthquakes in Luzon in the 19th and 20th century	
12.03.2019	Catherine Linard (Geography)	WorldPop: mapping population distributions for health and vulnerability assessments	14
	Emilien Nicolas (URBE, Biology)	Defying Muller's ratchet in asexual eukaryotes: lessons from bdelloid rotifers and amoebae	
02.04.2019	Camille Carpentier, Imen Ben Ammar, Mark Holmes (URBE)	GIS - Creative OR professional mapping to illustrate / analyse your data	16
07.05.2019	Valerie Cornet (URBE, Biology)	Optimizing the adaptability of salmon juveniles for restocking program in the Mosan Basin	29
	Diane Delangre (History, PolleN)	Bouquet cartographique wallon	
21.05.2019	Yann Hautier (Institute of Environmental Biology, Biology Department, Utrecht University)	Grassland biodiversity and ecosystem functioning in the Anthropocene	9
11.06.2019	Loïc Trompet (Physics)	First results from the NOMAD instrument on-board ExoMars Trace Gas Orbiter	8
	Jürg Spaak (URBE, Biology)	A unified definition for niche and fitness differences	
03.09.2019	Frédéric Silvestre (URBE, Biology)	From aquatic ecotoxicology to neurodegenerative diseases: why killifish will do the job!	24
03.10.2019	Mirco Bundschuh (Uni Landau)	Horizontal and vertical interactions in aquatic food webs under chemical stress	10

Table 5 continued.

Date	Speaker	Title	Number of participants
05.11.2019	Camille Carpentier (URBE, Biology)	Babel, or the ecosystem complexity discussion - concept maps and consequences	17
	Augustin Dekoninck (Geology)	Manganese for our daily needs: a metallogenesis approach to understand supergene ores	
03.12.2019	Imen Ben Ammar (URBE, Biology)	How hydropower plants affect the stress and health status in salmon smolts	19
	Sophie Moreaux (URBV, Biology)	COS-OGA elicitation induces different transcriptional responses between Monocots and Dicots	
13.12.2019	Ryan Earley (University of Alabama)	Sex, death, acrobatics and combat - Capitalizing on the weird biology of an amphibious fish	20
07.01.2020	Eric Perpete (Chemistry)	Structure, physico-chemical properties and dynamic aspects of biomolecular systems	8
	Virgile Neyman (Chemistry)	Design of biocontrolled pesticides based on detrimental insects trehalase inhibition	
06.10.2020	Mathieu Piavaux (History of Art and Archaeology)	Strategies for the supply of stones for medieval building sites (12th-16th century) - Review of recent interdisciplinary research	9

### Alternet

ILEE is part of [alternet](#), Europe's ecosystem research network. Alternet brings together international natural and social science researchers from 18 European countries to integrate our understanding of biodiversity, ecosystems, and the services they provide to society and to create a platform for meaningful communication with policy-makers and the public. Advantages of this membership include – among many others – the possibility for young researchers to participate at the [Alternet Summer School](#) in Peyresq in France, which provides training in inter-disciplinary approaches to biodiversity and ecosystems research. The network further offers the sharing of funding opportunities through the [Call Exchange](#) clearing house mechanism, which has already been used by several ILEE members and ebiom.

### 3.3. Social activities

#### *Teambuilding day & Happy Hour*

Once per year (except in 2020), a teambuilding day is organised for ILEE members. These combine an informative part with visits to the "Abbaye de Moulins" (2018) or the agroecological farm "Emeville" and the organic cooperative farm of Froidefontaine (2019), with a relaxed/fun part including physical activities in the afternoon. This day offers has been two times an excellent occasion to get to know people outside your laboratory in a laid-back environment, and was much appreciated by the members of ILEE taking part (20-30, increasing tendency). To be continued in 2021.

In December 2019, a first institutional Happy Hour was organised by URBE people and planned to take place ~every two months by a rotating team. ILEE contributes with 100 € to the expenses. This (first) event did not attract as many different disciplines as for example the teambuilding day. The difficulty to find a different organising unit and Covid-19 prevented a second edition so far. To be given a new trial in 2021.

### 3.4. Financial support for ILEE members

#### *ILEE Travel grant & Mobility of ILEE Researchers*

A first call for applications for an internal travel grant was launched in December 2018. It is supposed to support members in their participation at scientific conferences or to finance short stays abroad. Three calls are launched per year. The funding given to an applicant is limited to 500 € for trips within and 1.000 € outside Europe. The entire funding provided is up to 9.000 € per year, thus, 3.000 € per call are reserved. So far, 15 grants have been paid (summing up to ~9.200 €), another eight (~5.100 €) accorded for travels in 2020 had finally been cancelled due to the sanitary crisis.

*Table 6: Travel grants accorded in 2019 and 2020, sorted by name*

Year	Name	Department	Supervisor	Destination	Amount
2019	Alvarez, K.	History	I. Parmentier	USA	1.007,43 €
	Baekelandt, S.	Biology	P. Kestemont	Spain	500,00 €
	Chapelle, V.	Biology	F. Silvestre	USA	1.000,00 €
	Dekoninck, A.	Geology	J. Yans	France	350,00 €
	Deleu, R.	Geology	V. Hallet	Austria	500,00 €
	Henry, S.	Geography	S. Henry	Kyrgyzstan	958,00 €
	Léonis, S.	Physics	M. Lepère	France	500,00 €
	Moreau, S.	Biology	P. Van Cutsem	Morocco	857,98 €
	Olusoji, O.D.	Biology	F. De Laender	USA	500,00 €
	Perpete, E.	Chemistry	E. Perpete	Japon	500,00 €
	Redivo, B.	Biology	P. Kestemont	Spain	500,00 €
	Spaak, Jürg	Biology	F. De Laender	USA	500,00 €
	Trompet, L.	Physics	M. Lepère	Switzerland	500,00 €
	Verhaert, M.	Geology	J. Yans	France	500,00 €
2020	Begin, M.	Biology	P. Kestemont	Sweden	500 €
<i>cancelled</i>	Ben Ammar, I.	Biology	P. Kestemont	Portugal	500 €
<i>postponed</i>	Blanco Alvarez, Y.	Biology	F. Silvestre	USA	617 €
<i>cancelled</i>	Cornet, V.	Biology	P. Kestemont	Portugal	500 €
<i>cancelled</i>	Dekoninck, A.	Geology	J. Yans	France	500 €
<i>virtual</i>	Holmes, M.	Biology	F. De Laender	USA	500 €
<i>cancelled</i>	Poot, J.	Geology	J. Yans	Morocco	1.000 €
<i>virtual</i>	Spaak, J.	Biology	F. De Laender	USA	500 €
<i>postponed</i>	Vastrade, M.	Biology	K. Van Doninck	Japon	1.000,00 €

#### *ILEE project grant*

Since summer 2020, ILEE offers a new form of financial support to its members, the ILEE Project Grant - [Link](#). It aims at promoting interdisciplinary research between different teams within ILEE or teams of

ILEE and other research institutes of UNamur (intra- or inter- institutional). The proposed projects are of course supposed to relate to ILEE's research objectives. The amount offered is up to 15.000 € per project and year, with multi-annual projects being possible (up to 4 years). It aims especially (but not only) at the implication of emerging researchers, Master and PhD students. Co-financing by a second institute at UNamur may increase the amount to finance a PhD thesis for one year. The latter could aim for a FRIA/FRESH candidature following a first ILEE grant. Projects are supposed to be co-supervised by at least two promoters. Funding maybe provided for personal charges or operating costs including equipment, consumables, applications/programmes, travel expenses, etc. related to scientific use.

A first demand for this grant implicating a collaboration with NaXys could not yet be pushed forward since NaXys still has to decide whether they can envisage a similar source of financing. The same is true for a project envisaged with NISM. Another project aiming at continuing the collaboration between Johan Yans (Geology) and Mathieu Piavaux (History of Art and Archaeology) is planned to be submitted early 2021.

#### *Punctual financial support*

In December 2018, Mathieu Piavaux (History of Art and Archaeology) organised the international conference Stone by Stone in Namur and Dinant. ILEE contributed to its organisation with the donation of 2.000€. Due to unfortunate circumstances, the money was only transferred end of 2020.

The steering committee agreed in October 2019 to grant a credit over 17.000 € to Muriel Lepère (Physics) to acquire a new spectrometer Iris-F1. Finally, she received additional funding in early 2020 and the credit was no longer necessary. The spectrometer arrived in September 2020.

### 3.5. Support for (young) researchers

#### *Ateliers Principiae*

In collaboration with NaXys and thanks to the NARC budget of Frederik De Laender, two seminars on presentation skills could be offered to students and researchers. The lectures were given by Jean-Luc Doumont from Principiae, who is known for his highly applicable recommendations on a wide range of topics, and his book about "effective communication for rational minds". Seminar "Making the most of your presentation" on March 22<sup>nd</sup> 2019, and, in adaptation to home-office conditions: "Delivering your presentation remotely" on November 13<sup>th</sup> 2020.

#### *FRIA / FRESH seminars*

Since autumn 2019, ILEE organises exceptional lunch seminars for future PhD students. Candidates for a FRIA or a FRESH PhD grant are invited to hold their presentations during a seminar to practice their performance, their response to questions and get them prepared for the challenge. Four such seminars have been organised so far (

Table 7) with a significant participation of different disciplines. Five of the six presenting candidates received their PhD grant, which is an exceptional success rate (the mean success rate, all disciplines considered, is 25-30%). This clearly demonstrates the benefit of such interdisciplinary seminars.

#### *Expansion of tasks of the scientific manager*

From 2020 on, the tasks of the scientific manager have been expanded. Carolin Mayer now offers support to all members of ILEE whenever they have to prepare a presentation for a conference, a thesis defence, a poster, etc. She further helps with the writing of manuscripts for publication and corrects

for English language use. For joint ILEE projects, she can contribute to their coordination and support the implementation process. She can further assist with the supervision and monitoring of the progress or organise the logistics and communication of scientific activities and experiments.

Table 7: FRIA/FRESH candidates in 2019 and 2020

Date	Speaker	Department/ Supervisor	Title
22.10.2019	Virgile Neyman	Chemistry, Perpète	Design of biocontrolled pesticides based on detrimental insects trehalase inhibition
	Mahaut Begin	Biology, Kestemont	Etude des mécanismes de toxicité des nanoparticules de zinc et de titane et de leur impact sur le système immunitaire de la truite arc-en-ciel ( <i>Oncorhynchus mykiss</i> )
	Mark Holmes	Biology, De Laender	The effect of intraspecific trait diversity on community resistance to multiple biotic and abiotic stressors
31.10.2019	Yves Blanco Alvarez	Biology, Silvestre	The evolutionary enigma of a mixed-mating system in a self-fertilizing vertebrate, <i>Kryptolebias marmoratus</i>
	Mahaut Begin	Biology, Kestemont	Etude des mécanismes de toxicité des nanoparticules de zinc et de titane et de leur impact sur le système immunitaire de la truite arc-en-ciel ( <i>Oncorhynchus mykiss</i> )
	Tessa de Bruin, UCL	Biology, De Laender (co-supervisor)	Does intraspecific variation modulate the effects of Environmental Change Drivers on population and community ecology?
12.10.2020	Virgile Neyman	Chemistry, Perpète	Design of biocontrolled pesticides based on detrimental insects trehalase inhibition
10.11.2020	Julie Duchene	History, Parmentier	L'Homme et le Loup, du XVIIIe au XXe siècle. Etudier le passé pour préparer l'avenir

## 4. Specific criteria

### 4.1. Support for development cooperation

As expressed in one of core research topics ([→ \*Environmental and Natural Resource Management in the South\*](#)), ILEE members cooperate with partners situated in developing countries through research projects, supervision of doctoral theses, onsite lecturing activities, organisation of humanitarian help (e.g. “mapathons”) or valorisation of artisanal products. They are further active in institutions and organisms that support development cooperation, such as ARES (Académie de recherche et d’enseignement supérieur) or the FUCID (Forum Universitaire pour la Coopération Internationale au Développement).

### 4.2. Missions or interventions as expert in inter-/national organisations

Researchers affiliated with ILEE are highly demanded as experts in national and international organisations (Table 8). These include various research councils & scientific commissions, steering committees, international panels in Europe and around the rest of the world. They organise information days, workshops and training sessions for associations or organisations and act as experts for private companies and even accompany royal missions (to Morocco in 2018)!

Table 8: National and international organisations where ILEE members intervene as experts

Country of registration	Organisation
Belgium	<p>ARES-CCD (board and commission)</p> <p>Belgian Association of Geomorphologist (BAG)</p> <p>Belgian Society of Toxicologists and Ecotoxicologists</p> <p>Belgian Zoological Society</p> <p>Centre belge d'études karstologiques (CBEK)</p> <p>Comité belge des hydrogéologues (CBH)</p> <p>Compagnie Intercommunale Liégeoise des Eaux (CILE)</p> <p>Contrat rivière</p> <p>European Commission, H2020</p> <p>International Union for the Scientific Study of Population (IUSSP)</p> <p>Panel on Migration-Climate-Health</p> <p>Keyfood</p> <p>Lhoist industrie</p> <p>Société Publique de Gestion de l'Eau (SPGE)</p> <p>Société wallonne des eaux (SWDE)</p> <p>SPW - DEMNA (Département de l'Etude du milieu naturel et agricole)</p> <p>SPW (Service Public de Wallonie) Aquawal – secteur carrier</p> <p>SPW - comité d'accompagnement de plusieurs commissions scientifiques</p> <p>Union belge de spéléologie</p>
Canada	Natural Sciences and Engineering Research Council (NSERC)
Chile	Iniciativa científica milenio
France	<p>French National Research Agency (ANR)</p> <p>High Council for the Evaluation of Research and Higher Education (HCERES)</p> <p>Institut de Recherche pour le Développement (IRD), commission CSS4 sciences humaines</p> <p>Institut National de la Recherche Agronomique (INRA)</p>
Germany	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), United Nations
Italy	Academy of Sciences for the Developing World
Kazakhstan	National Centre of Science and Technology Evaluation
Morocco	<p>Belgian-Moroccan mining sector</p> <p>Fédération Wallonie-Bruxelles (WBI): Academic mission "Marcourt"</p> <p>Royal economic mission to Morocco (25.-30.11.2018)</p>
n.a.	International Steering Committee of the International Conference on High Resolution Molecular Spectroscopy
n.a.	Population and Environment Research Network
Poland	Polish National Science Center
Portugal	Regional policy for the strengthening of research, the Portuguese Foundation for Science and Technology (FCT)

### 4.3. Connection to the business world, creation of spin-offs



FytoFend S.A. is an innovative spin-off of the Research Unit in Plant Cellular and Molecular Biology (URBV) of the University of Namur. The company was created in 2009 and specialises in plant protection using elicitors (natural stimulators of plant defences). The connection between ILEE and FytoFend is very tight and persists through common projects (BACTOFIGHT, PATHOFLAX). <https://www.fytofend.com/fr>



e-biom is a spin-off launched by the Research Unit of Environmental and Evolutionary Biology (URBE) in 2018. It has been founded by Jonathan Marescaux and Karine Van Doninck with the support of the Walloon Region, with the commitment to offer reliable and efficient tools for biological monitoring and ecological assessment. <http://e-biom.com/>



TRAQUA is a spin-off issuing from the Department of Geology (Amaël Poulain), that will become independent in early 2021. It offers expertise and innovative fluorimeters to actors in the water field, with the aim to make this type of analysis and monitoring more accessible for the management and protection of water resources. The first model of the STREAM® fluorimeter was developed in 2015 by and Geert De Sadelaer, as part of Amaël Poulain's Ph.D. thesis in karstic hydrogeology (supervisor Vincent Hallet). <https://traqua.be>

Further partnerships between ILEE members and private companies exist either through confidential expertise with industries or through research partnerships with private companies such as Prayon, Delacon, Nuscience, Mithra, EDF-Luminus, ProFish Technology, Unilever, Managem, Arche consulting, Leakey Foundation.

### 4.4. Partner institutions (museums, ...)

Partner institutions other than the numerous laboratories at international universities include the Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Museum d'Histoire Naturelle de Paris, The Foundation of Piri Daiza, the Royal Belgian Institute of Natural Sciences (RBINS), the Royal museum of central Africa (MRAC), Sciensano, Société Publique de Gestion de l'Eau (SPGE), Institut national de l'environnement industriel et des risques (INERIS), Institut National de la Recherche Agronomique (INRA), Province de Namur, secteur patrimoine culturel; Agence wallonne du patrimoine (AWAP); Institut royal du patrimoine artistique (KIK-IRPA); Archives de l'Etat; Musée La Fonderie; Inter Environnement Bruxelles; BruxellesFabriques; Ministère de l'enseignement RDC.

### 4.5. Patents

End of 2020, Patrick Kestemont and his team (URBE, Biology) submitted a patent on a new beta-glucan strain.

### 4.6. Outreach activities, popularisation

At open lectures, workshops for other scientists, stakeholders, associations or schools, Printemps de sciences, ILEE members frequently interact as teachers, speakers or are the organisers themselves. They are also highly demanded experts invited to conferences and discussion rounds for the large public, organised by the FUCID, GRICE (Groupe de recherche interdisciplinaire sur la crise écologique),

Geopark, communauté française, communities, cultural organisations, “cercles”, ARES, etc. Discover here a few examples of the various interventions (see further **4.6 Fehler! Ungültiger Eigenverweis auf Textmarke.** and consult the [newsletters of ILEE](#)):

- Vincent Hallet (Geology) is among the founding members of the UNESCO Geopark Famenne – Ardenne, organises public conferences and visits to the caves of Han. He conceived and manages the geological and pedological pathways (12 publications up to date) that show the links between the below-soil (geology), landscape aspects (geomorphology) and soil (pedology).
- Nicolas Dendoncker (Geography) is among the scientific experts supporting *Tchak !*, an editorial project including a quarterly magazine, website, social media, wants to unite around small-scale farming, agroecology and new models of production, distribution and consumption (short supply chains, farm shops, etc.).
- Johan Yans (Geology) spoke at events dedicated to find political solutions for the problem of blood diamonds (organised by FUCID) AND to achieve an integral transition (organised by Maison du Développement Durable at LLN).
- Johan Yans and Karine Van Doninck gave talks at the TEDx UNamur conference in 2018 and 2019. In times of the sanitary crisis when visits to schools and other opportunities to present research to the larger public are limited, the geologists looked for other possibilities to demonstrate their study objects and show the beauty of rocks and minerals with wonderful photographs taken by Gaetan Rochez on Instagram.
- Patrick Kestemont, Johan Yans and Frédéric Silvestre are present every year at the International Nature Festival of Namur (FINN) and give talks, assist during podiums discussions, accompany exhibitions, etc.
- Popularisation and information of the larger public about the subject was an elementary aspect of the Interreg project DIADEM. Three short videos were produced, the team of Patrick Kestemont took part in the Printemps des Sciences in 2018 et 2019. [Find here the links to the videos and several media interventions](#)
- Mathieu Piavaux (Art History and Archaeology) held a conference for the Archaeological Society of Namur (SAN) on the "small popular heritage of the province of Namur" in October 2020.
- During the World Urban Forum in Abu Dhabi, UAE, beginning 2020, Catherine Linard (Geography) organised a training event called "Innovations in mapping the diversity of urban slums with free open-source solutions" for stakeholders (and geospatial scientists). Especially during the past months of the Covid-crisis, her face was common on television (see also presence in the media) and the quality of her interventions are recognised by the nomination as candidate for the 2020 award for the trophy of the magazine Matière Grise (RTBF). This award honours researchers for the quality of their public interventions to foster attitudes of knowledge sharing and passion for research.
- Sabine Henry (Geography) is regularly present at events organised by FUCID, as for example during an open discussion on current migration routes, implications of crossing a border, necessity of retaining or removing borders in November 2019.
- Isabelle Parmentier (History) participated in a round table discussion on “Transition écologique : quelle politique agricole envisager ?” organised by the Kap Vert, at UCLouvain, in March 2019.

ILEE members further contribute oftentimes to video sequences of the audio-vision service of UNamur or the "Confluent de Savoirs", or for the “Nuit Européenne des chercheur.e.s”. For example, [Pollination](#) with Nicolas Dendoncker, addresses the decline of wild bee species in Belgium (project BELBEES). Mathilde Maceaux (Art History and Archaeology) explains the importance of [water](#) in monasteries of

the middle age. [Drugs in watercourses](#) deals with emerging pollutants with Patrick Kestemont (project DIADEM). Johan Yans is interviewed on the [extraction of minerals](#) and sustainable development. Géraldine van Aubel (URBV, Biology) explains how she got dragged to study the stimulation of innate plant defence mechanisms against bacteria and viruses in the new series "Le Monde Des Chercheurs".

#### 4.7. Presence in the press and social media

ILEE members are regular guests in TV emissions such as "Questions à la une", "CQFD", "Le jardin extraordinaire", "Investigations" and others. They are further often invited as interview partners in radio programmes and consulted as experts in the newspapers, national as well as international ones. ILEE has its own Facebook, Twitter and Instagram account where news is spread. Please refer to the newsletters of ILEE to find numerous examples, there is a section of "ILEE members in the media".

<https://ilee.unamur.be/newsletters>

## 5. Auto-evaluation

### *Strengths - Weaknesses*

One of the big advantages of ILEE is probably also one of its largest challenges: ILEE embraces the academic disciplines of humanities, social and natural sciences and along with them, different cultures of research approaches, publication and communication practices. Similar research institutes, for example the Earth and Life Institute (ELI) of the UCLouvain, which is, as regards to numbers (300 members), almost three times the size of ILEE, comprises five research poles: agronomy, biodiversity, earth and climate, environmental sciences and applied microbiology. Thus, ILEE combines a larger variety of disciplines. Eventually, this may ease collaboration within ILEE since the competition between the research groups is of course lower or non-existent and they can act as complementary partners. The smaller size can further be advantageous for a familiar atmosphere and increased recognition.

Besides the financial support, being affiliated to ILEE offers its members advantages (inclusion in altnet, see page 19) that single researchers or labs would not have. The visibility of ILEE as institute and its members has already increased and ILEE receives candidatures and contact requests via the website on a regularly basis. The Twitter account has predominantly external followers.

### *Perspective: promote interdisciplinary research without ignoring the importance of monodisciplinarity*

For decades, researchers have been encouraged to specialise within their discipline, still, the career of a scientist usually follows this premise. As already mentioned above, also financing bodies to date rarely promote interdisciplinary collaborations and if so, inner-university collaboration is rather punished (Bromham, Dinnage & Hua, 2016; Pedersen, 2016). Thus, such kind of collaboration remains a challenge and it surely requires a process of several years and appropriate incentives to motivate scientists to look beyond their own expertise. To stipulate interdisciplinary research, a structural reorganisation already seems a good way to push forward interdisciplinary research. In addition, it can even have positive effects on general research and grant activity (Leahey & Barringer, 2020).

ILEE already proposes several opportunities to meet and discuss the topics of its research among the different disciplines. These will be continued in the future. With the arrival of the scientific manager, activities and exchange between the different research groups united within ILEE were actually launched and gained momentum. The newsletters, website, flyer etc. helped to get people "on board".

Especially the newsletters are highly appreciated and a good communication tool within but also beyond the institute. Additionally, the kick-off meeting and the annual research days are important events to strengthen the links between the researchers. The feed-back is always very positive regarding the quality of presentations, the variety of topics but also regarding the setting and the pleasant atmosphere. This year's pandemic and imposed lack of on-site events made it obvious that such occasions are significant for discussions and exchange which eventually can fruit in collaboration on a project level. One should not forget that activities proposed within ILEE remain voluntary and often demand an additional investment of already limited time from the researchers.

The launch of the ILEE travel grant and now the ILEE project grant made researchers recognise the opportunities of their affiliation to ILEE. These financial support mechanisms will of course go on. Even if no project proposals have been submitted yet, we know that ILEE members are already taking them into account and applications will eventually be submitted.

It would be preferable if funding opportunities could be amplified internally among the research institutes of UNamur as well as externally on a regional or federal level to further promote inner-university collaborations. For example, the ILEE project grant is a good start, but would need further support by other institutes to possibly finance PhD theses. Ideas for two common projects with NISM and naXys this autumn seemed premature for a financing through the partner institutes and could not yet be carried further. If the other research institutes could follow the same dynamic, this would definitely broaden possibilities.

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