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Laudatio for the Award Ceremony of the Prix Schläfli Astronomy 2020 of the Swiss Academy of Sciences (SCNAT) for Dr Oliver Müller

The Jury of the Prix Schläfli Astronomy 2020 of the Swiss Academy of Sciences (SCNAT) – consisting of Professors Georges Meynet (Uni. Geneva), Sebastiano Cantalupo (ETHZ), Pascale Jablonka (EPFL), Francesco Pepe (Uni. Geneva), Friedrich-Karl Thielemann (Uni. Basel), and Nicolas Thomas (Uni. Bern) – has after a careful evaluation decided to bestow the Prix Schläfli 2020 in astronomy to Dr Olivier Müller for challenging the standard model of cosmology by showing that dwarf galaxies do not follow random orbits around the giant galaxy Centaurus A.

Dr Müller's highly successful work is related to dwarf galaxies and their crucial role in the epic problem of dark matter. There is a well known peculiarity in the Local Group of galaxies: the dwarf satellites of the Milky Way and Andromeda galaxies are distributed in corotating disk-like structures, which is very difficult to explain within the framework of the standard ΛCDM model of cosmology. The question has therefore always been whether these two local cases would be statistical outliers, or whether such flattened, corotating structures were the rule. Now we know the answer: Oliver Müller succeeded to find a third case of a dwarf galaxy plane around Centaurus A, the famous southern giant galaxy whose surroundings he had extensively studied in his PhD work. A systematic comparison with numerical simulations showed that the probability for such a coherent structure to appear by chance is less than 1%. Clearly, dwarf satellite planes are a common phenomenon in the universe and their formation must be explained. The 'plane-of-satellite problem' is now acknowledged as a serious, if not the most serious problem for standard cosmology with cold dark matter by the experts. Müller and his colleagues succeeded in publishing this breakthrough result in the Science magazine, where it made the cover story: *A whirling plane of satellite galaxies around Centaurus A challenging cold dark matter cosmology* (Müller et al. 2018, Science 359, 534). The response in the scientific community and in the worldwide media was accordingly large.

Dr Oliver Müller studied physics and astronomy at the University of Basel where he earned his MSc in physics in 2014, and his PhD in astronomy in 2018. The Science paper for which Oliver Müller is awarded the Prix Schläfli is part of his dissertation entitled *Small-scale cosmology with dwarf galaxies*, supervised by Prof. Dr. Bruno Binggeli and graded summa cum laude. Dr. Müller is currently affiliated at the Observatoire Astronomique de Strasbourg as SNF Early Postdoc Mobility Fellow.

For his outstanding scientific work Dr Oliver Müller was awarded several prices before (all in 2019): the Edith A. Müller Price of the Swiss Society for Astrophysics and Astronomy, the Amerbach Price of the University of Basel, as well as the Klar-Text-Preis of the Klaus-Tschira-Stiftung for the best popular science article in the category Physics.

Prof. Georges Meynet, President of the jury

Award Ceremony, Geneva, 24 September 2021

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Laudatio for the Award Ceremony of the Prix Schläfli Geosciences 2020 of the Swiss Academy of Sciences (SCNAT) for Dr Fabian Rey

The jury of the Prix Schläfli 2020 in Geosciences of the Swiss Academy of Sciences (SCNAT), consisting of Dr Charles Fierz (SLF Davos), Dr This Rutishauser (kontextlabor.ch), and Dr Ulrich Krieger (ETH Zürich) has evaluated six high quality applications and proposed to award the prize to Dr Fabian Rey for his publication entitled 'Causes and mechanisms of synchronous succession trajectories in primeval Central European mixed *Fagus sylvatica* forests'. The board of the Platform Geosciences then unanimously endorsed the decision of the jury and awarded the Prix Schläfli 2020 in Geosciences to Dr Fabian Rey.

The study shows how mixed beech *(Fagus sylvatica)* forests may spread driven by a changing climate and also clearly differentiates between anthropogenic and natural effects. While giving answers to present day questions with regards to climate change impact on our current and future environment, the study is based on palaeoecological data series of laminated sediments from two small lowland Swiss lakes dating back 6500 – 4200 years before our time with an unprecedented time resolution of 11 years. The publication is thus an excellent example of how to use and bring a well established method to perfection in order to address topical issues related to the present and future evolution of our environment under a changing climate.

One particular strength of Dr Rey's publication is the well written story that keeps the reader attentive from the introduction to the conclusions. Therefore the main messages of the study get very well across to an audience of non specialists. This is a sign of the awardee's maturity in communicating his results to a wide and interested scientific readership. In short, warmest congratulation from the jury to Dr Fabian Rey for this outstanding contribution to palaeoecology.

Dr Fabian Rey obtained his MSc in climate sciences from the University of Bern and was awarded his PhD degree in palaeoecology by the University of Bern where he was affiliated with the Institute of Plant Sciences (IPS) and the Oeschger Centre for Climate Change Research (OCCR). His thesis advisors were Prof. Dr Willy Tinner, Prof. Dr Albert Hafner, and Dr Adrian Gilli. Dr Fabian Rey is now Laboratory Manager of the Geoecology Research Group, Department of Environmental Sciences, University of Basel.

Dr Charles Fierz, president of the jury of the Prix Schläfli 2020.

Award Ceremony, Bern, 6 November 2020

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Laudatio for the Award Ceremony of the Prix Schläfli Chemistry 2020 of the Swiss Academy of Sciences (SCNAT) for Dr Robert Pollice

The Jury of the Prix Schläfli 2020 of the Swiss Academy of Sciences (SCNAT), consisting of Professors C. Bochet (U. Fribourg), T. Bürgi (U. Geneva), C. Copéret (ETHZ), C. E. Housecroft (U. Basel, president), K. Koch (PH Bern), S. Sturla (ETHZ) and O. Wenger (U. Basel), has decided to award the prize to Dr. Robert Pollice for excellence in a research project which culminated in a high impacting publication in the Journal of the American Chemical Society entitled 'Origin of the Immiscibility of Alkanes and Perfluoroalkanes'.

Dr Pollice completed his PhD in 2019 having studied in the research group of Professor Peter Chen at the ETH Zürich.

His doctoral research was within the field of physical organic chemistry and the main focus was to investigate the fundamental interactions in organic molecules which dictate their structures in the gas-phase and also in solution. His results contributed towards an understanding the role played by London dispersion forces.

The paper for which the Prix Schläfli has been awarded was published in the high impacting Journal of the American Chemical Society in 2019 (J. Am. Chem. Soc. 2019, 141, 3489-3506) with Dr Pollice as the principal author. The paper deals with the phase properties of perfluoroalkanes and their miscibility with alkanes. The results of detailed computational modeling carried out by Robert Pollice demonstrated that the shapes of the perfluoroalkane molecules prevent favourable packing with other materials and results in very weak intermolecular interactions. This new model provides a much-needed explanation for trends in the experimental properties of perfluoroalkanes and, as a result, gives a new and exciting starting point which will assist researchers to proceed with the design of new materials which are more environmentally benign than perfluoroalkanes.

We congratulate Robert Pollice on his achievements and wish him well in his future career.

Prof. Catherine E. Housecroft, Platform Chemistry of the Swiss Academy of Sciences

Award ceremony, 25 February 2020 in Zurich, ETHZ

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Laudatio for the Award Ceremony of the Prix Schläfli Biology 2020 of the Swiss Academy of Sciences (SCNAT) for Dr Alice Berhin

The Jury of the Prix Schläfli (Biology) 2020 of the Swiss Academy of Sciences (SCNAT), consisting of Prof. Dr. Roman Ulm (University of Geneva), Dr. Marc Creus (University of Basel), and Prof. Dr. Oliver Heiri (University of Basel), has reviewed 22 applications and suggested to award the prize to Dr. Alice Berhin for her achievements in the field of Plant Molecular Biology published in the journal Cell with the title: 'The Root Cap Cuticle: A Cell Wall Structure for Seedling Establishment and Lateral Root Formation'.

The board of the Platform Biology has unanimously decided to award the Prix Schläfli Biology 2020 to Dr. Alice Berhin for her discovery of a novel anatomical structure in plants, the root cap cuticle. The cuticle is a multi-layered structure of lipid components that is long known to protect aerial parts of plants against desiccation and other environmental stresses. In her PhD work, Alice first provided solid evidence for a root cap cuticle, a structure until then unknown despite the thorough description of the general anatomy of plants since the 19th and early 20th century. Her discovery was supported by the analyses of the root surface ultrastructure using electron microscopy, lipid staining as well as chemical analysis by gas chromatography-mass spectrometry. Moreover, Alice could further substantiate the existence of the root cap cuticle by characterizing transgenic plants expressing a cutinase degrading cutin at the root cap and mutants in biochemical pathways providing potential cuticular substrates. Furthermore, she succeeded in demonstrating the biological relevance of the root cap cuticle for root growth, seed germination and abiotic stress resistance. The PhD work of Dr. Alice Berhin is a true breakthrough study that represents a paradigm shift in the understanding of root anatomy and root cap function.

Dr. Alice Berhin studied Bioengineering at the Catholic University of Louvain, Belgium. Then Alice performed her PhD work in Life Sciences entitled 'Identification and characterization of atypical polyester in the root of Arabidopsis thaliana' in the Department of Plant Molecular Biology at the University of Lausanne, under the supervision of Dr. Christiane Nawrath. In February 2020, Dr. Alice Berhin became a SNSF funded Postdoctoral Researcher at the Catholic University of Louvain, Belgium, in the laboratory of Prof. Dr. Charles Hachez.

Prof. Dr. Roman Ulm (University of Geneva), Dr. Marc Creus (University of Basel), and Prof. Dr. Oliver Heiri (University of Basel), members of the board of the Platform Biology of the Swiss Academy of Sciences (SCNAT)

Award Ceremony, 17 February 2020, LS^2 Annual Meeting

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