UF UNIVERSITY of FLORIDA

Institute of Food and Agricultural Sciences
Agricultural and Biological Engineering Department

Frazier Rogers Hall
PO Box110570
Gainesville, FL 32611-0570

TO: Future Earth Coasts

RE: Support to Dr. Convertino for the Future Earth Coasts Fellow position

Oct 10, 2023

Dear Committee/TO WHOM is interested,

It is a pleasure to write a letter of support for Dr. Matteo Convertino who applied for the Fellow position in your Organization. I was Dr. Convertino's Post-Doctoral Research supervisor at the University of Florida, Gainesville. My research interests are on the field of environmental hydrology (flow and contaminant transport), including interactions with ecological and industrial systems, and on stakeholder involvement for environmental management. In addition to developing numerical tools, my group is very active in the evaluation of a wide variety of mathematical models through novel global sensitivity and uncertainty analysis methods for understanding and modeling coupled natural human systems.

Dr. Convertino joined our team in 2010 to provide quantitative expertise in mathematical modeling of coupled natural and human systems focusing on the links between earth systems and other biological systems. His main expertise is in complex systems/biocomplexity with focus on dynamical processes in ecosystems analyzed via complex network, risk analysis and decision science, applied to natural and human systems and their coupling. His background in environmental sciences and engineering, mathematical analysis and computational modeling is particularly profound. He obtained his undergraduate and graduate degrees at the University of Padova, Italy (Civil and Environmental Engineering Science) one of the most renowned universities in his country and one of the oldest in the world. During his Ph.D. he participated in the shared doctoral program with Princeton University (USA), Department of Civil and Environmental Engineering, at the ecohydrology group of Ignacio Rodriguez-Iturbe, which contributed to round off Dr. Convertino as an excellent academic. At Princeton he studied the origin and dynamics of the distribution of aquatic and plant species in the Mississippi-Missouri river basin through a stochastic information-theoretic and network-based metacommunity model that was also able to quantify human influences on such distributions that has relevance to ecosystem sustainability. The information-theoretic models developed for this line of research are open-source and easily applicable in modeling a variety of network processes such as disease and invasive species spreading as well as any information spreading process in socio-ecological systems. For instance, Dr. Convertino is working on understanding and modeling infectious disease outbreaks (with WHO collaborations) and foodborne disease spreading on the food supply chain by coupling his network transport model with a spatially explicit epidemiological model. For these two projects he was working with colleagues at the Emerging Pathogens Institute at the University of Florida.

Dr. Convertino worked with us at UF on a variety of projects funded by NSF, NASA and the Dept. of Defense. Relevant projects he worked on were about (i) analysis and modeling of sea level rise effects on the Florida coastal ecosystem; (ii) evaluation of resilience of a coupled natural human system in the Amazonia (Brazil, Peru, and Bolivia border) affected by the construction of the transoceanic highway; (iii) risk and decision science model for the Everglades restoration project (paper accepted in Scientific Reports – Nature Publishing Group); (iv) modeling of the spread of cholera in river networks in Cameroon; and (v) supply chain risk model for food safety in the USA. In addition to these major projects, he was very proactive by seeking new collaborations with other researchers in the university and elsewhere. Outside of our research group he collaborated regularly with the US Corps of Engineers, Engineers Research and

Development Center, and the Department of Energy by developing risk and portfolio decision model for natural and human systems. All these complex system models coupled to risk and decision science models are clearly innovative and they will bring new knowledge of processes and applications to the respective field of investigation. His efforts are extremely useful for quantifying unknown processes and systems' interactions useful for addressing global system risk useful policy and decision making. Dr. Convertino' s work has been promptly translated into top journal publications and I am very impressed by the number (70) and quality of Dr. Convertino's articles as well as by the number of citations to those articles in a relatively short period – a remarkable achievement for a young researcher.

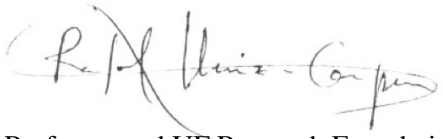
In terms of grantsmanship, Dr. Convertino is fully involved as co-PI in submitted competitive proposals to several US federal agencies like SERDP, ERDC, EPA, DARPA, FDA, NSF, and NIH as well as international organization. There is no doubt that Dr. Convertino and our team will continue to collaborate together as it has been since he left UF; a collaboration that has been manifested by our mutual work since he joined the University of Minnesota, Hokkaido University in Japan, and recently at Tsinghua University, SIGS. During the time spent at the University of Florida he created many useful connections with professors in our department, within the university (for instance, the Institute of Food and Agricultural Sciences, the Wildlife Ecology and Conservation Department and the Emerging Pathogens Institute), with governmental institutions, and with other universities (Florida State University, Arizona State University, University of Virginia, MIT, UMass Boston, University of Firenze). All these connections have resulted not only in publications, but also in grant writing, new and exciting research opportunities, and practical applications. As for his teaching ability, he demonstrated his capability to be an effective teacher during the weekly seminars of our integrative research group, and courses on "Biocomplexity and Decision Science", in which he was successfully able to explain basic and advanced topics to students, faculty, and professionals. At UF he was in charge of organizing and moderating our weekly research group seminars (regularly attended by 25 people including 18 graduate students), which focus on sharing the latest research, improving scientific communication, ethical issues and discussion of currently most relevant scientific topics.

Lastly, I would like to spend some words about his work at the University of Minnesota Twin-Cities and more recently at Tsinghua University where he is Associate Professor. In that capacity, as PI of the TREES Lab, Dr. Convertino performs research and development about models and associated computational technology for socio-environmental systems design and management at a variety of spatial and temporal scales. In particular he is working on a variety of ecosystem topics – in a big framework of ''ecosystem health/sustainability'' – in relation to projects sponsored by international, federal and state agencies: worth mentioning are the projects with (1) PAHO/WHO for creating an infectious disease infrastructure to predict and control infectious diseases in the Americas in relation to environmental dynamics; (2) the Epidemic Prediction Initiative funded by CDC and the White House OSTP; (3) the Minnesota Department of Health/CDC ''BRACE'' project related to study climate-related morbidity and mortality in USA mediated by air pollution; and (4) the Japan Society for the Promotion of Science grant for studying collective dynamics of the microbiome. I am also aware of his effort with the NSF SRN project about understanding and design of urban environment considering population risks such as air pollution (http://www.sustainablehealthycities.org). Broadly speaking, he is framing all his modeling efforts into a unified information theoretic framework and pushing that to integrate machine learning/statistical physics models capable of automation for real time applications such as ecosystem surveillance. Dr. Convertino is also very much involved in disseminating research products to the community. In fact, beyond his academic position he is also Chief Science and Technology Officer of S.M.A.R.T. Solutions, a start-up company created in collaboration with the University of Minnesota Twin-Cities. In this position he applies research-developed computational models (information theoretic and decision-based models) across several industry types; in particular he is focusing his attention on an automated portfolio decision model for dynamic design and asset management of natural and man made systems.

In addition to his impressive research qualifications, he is a most pleasant and stimulating colleague to work with, open to new ideas, critique, new collaborations, and very effective in mentoring students. I strongly believe he is prepared for the amount of stress and responsibility of a Senior Fellow position in a top-tier Organization like yours where he can find impactful applications of his work. His work with us has been transformational. I also emphasize the extremely high fit Dr. Convertino has with your wide

department research mission (Data Science and in particular for for the Environment-Ecology Nexus). I believe the fit goes beyond the specifics of this position and Dr. Convertino will be able to collaborate with many colleagues within your Organization. For all these reasons, I give my highest recommendation for Dr. Convertino as a unique and outstanding candidate, indeed a stellar asset for this Fellow position. Dr. Convertino's work in Biocomplexity, Data Science and Ecosystem Dynamics/Health (particularly applied in Aquatic Ecosystems with a keen interest in coastal and marine) is at the forefront of his field and has achieved national and international impact considering its scientific relevance and the pressing real world needs. *I am confident that his capacity, training, flexibility, openness to new ideas and collaborations, work ethics, and personal skills will make him extremely successful as an academic in your Organization and worldwide*. Please do not hesitate to contact me if you have additional questions about the candidate.

Sincerely,



Professor and UF Research Foundation Professor
Agricultural and Biological Engineering Department