France-Berkeley Fund

Annual Report 2020-21



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(2020-21)

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Égalité Fraternité

Established in 1993 as a partnership with the French Ministry of Foreign Affairs, the France-Berkeley Fund (FBF) promotes and supports scholarly exchange between faculty and research scientists at the University of California and their counterparts in France.

Through its annual grant competition, the France-Berkeley Fund provides seed money for innovative, bi-national collaborations in all disciplines. The Fund's core mission is to advance research of the highest caliber, to foster interdisciplinary inquiry, to encourage new partnerships, and to promote lasting institutional and intellectual cooperation between France and the United States.

FROM THE DIRECTORS

he impact of the coronavirus over the past 18 months has, without a doubt, dramatical altered the landscape of international collaboration. Yet international collaboration has also driven responses to the pandemic, mobilizing researchers around the world to work together ar share their knowledge. Indeed, by highlighting our deep interconnectedness, this time of crisis has intensified the importance of global cooperation to tackle today's collective challenges. It is in this spirit that the France-Berkeley Fund reaffirms its commitment to nurturing robust exchanges and sustaining lasting collaboration across geographic and disciplinary boundaries.

Amid continued disruptions to travel worldwide, we've been heartened to see our 2020 grantees launch fruitful virtual exchanges, in eager anticipat of connecting in person. We are also delighted to support 17 new projects in 2021-22, thanks to the generous sponsorship of the French Ministry of Foreign Affairs and the UC Berkeley Office of the Chancellor for Research, as well as the Lawrence-Berkeley National Laboratory, which joined the Fu again last year. Our renewed partnership with the has enabled expanded transatlantic research on ar of interest to the international scientific communi including climate-resilient agriculture and state-ofthe-art hydrological modeling. This year's cohort showcases the amazing diversity of interests and methods that characterizes the FBF—from wildfire mapping to philosophical inquiry, fungal viruses to assisted orchestration, data science to post-colonial cultural studies. Some teams address pressing social issues, such as strengthening democracy and decreasing the gender gap in entrepreneurship. Across the gamut of the humanities, social sciences, and STEM fields, we are eager to see the results and impacts of this innovative work.

We sincerely thank the many proposal reviewers at Berkeley and in France, together with our Executive Committee, who generously dedicated their time and effort to the evaluation process. Thanks to outgoing Committee member Natalie Roe, who facilitated our

lly	partnership with the Lawrence Berkeley National Laboratory. Special recognition goes to Yves Frénot, Counselor for Science and Technology at the French Embassy, for his steadfast service and support. We also welcome the newest member of our Committee,					
nd r	Professor Kristie A. Boering (Chemistry and Earth and Planetary Science, UC Berkeley), and Frédéric Jung, Consul General of France in San Francisco, whose cooperation we value in advancing the FBF's core mission.					
2	Bilateral grant programs such as ours have a key role to play in championing joint research and addressing contemporary challenges that transcend national borders. As we navigate the ongoing effects of the pandemic, the France-Berkeley Fund looks ahead with optimism that international collaboration remains					
tion	strong and will continue to advance in the years to come.					
Vice	Sincerely,					
und Lab Ireas Iity,	Larry M. Hyman Clément Sanchez Co-Directors					
f-	Julia Nelsen Program Manager					

GRANTEE NEWS



THE DAILY CALIFORNIAN Friday, June 4, 2021					NEWS			
News	Sports	Arts	Opinion	Blogs	Multimedia	Weekender	Featured	
CAMPUS	CITY COUNT	Y UC S	TATE NATIONAL	. ASUC O	BITUARIES RESEARC	H&IDEAS ELECTION	IS 2020 COVID-19 NO	TES FRO

RESEARCH & IDEAS

Researchers link global cooling to emergence of islands in Southeast Asia



1 New research on drought resistance in California oaks, from the FBF '18 team led by Todd Dawson (Integrative Biology, UC Berkeley) and Sylvain Delzon (INRAE Bordeaux), has been published in the *Proceedings* of the National Academy of Sciences, USA. The team found that California oak species have remarkably droughtresilient xylem, and that the development of drought resistance shaped the evolution and geographic distribution of oaks in California. The blue oak pictured (Quercus douglasii) is one of 19 oak species that live in California, many of which are endemic to California and central components of California ecosystems. 2 Research by 2018 grantees Nicholas Swanson-Hysell (Earth & Planetary Science, UC Berkeley) and Yves Goddéris (Géosciences Environnement Toulouse) led to the discovery that the Greenland ice sheet originated with a chain of islands in Southeast Asia, 15 million years ago. 3 2015 grantees Nipam Patel (Molecular & Cell Biology, UC Berkeley) and Marianne Elias (Muséum National d'Histoire Naturelle, Paris) published new findings in the May 2021

Journal of Experimental

Biology investigating the

WEDNESDAY, SEPTEMBER 30, 2020



structure, development, and evolution of wing transparency in butterflies and moths. Their research on glasswing butterflies tracked the formation of detailed nanostructures on the surface that could provide bioinspiration for new reflective materials. **4** FBF '18 grantee Danica Chen (Nutritional Sciences & Toxicology, UC Berkeley) published new research identifying proteins that control chronic inflammation in the immune system, with major implications for aging and the treatment of disease. (Pictured: The NLRP3 receptor protein responsible for detecting pathogens in the body and launching an immune response.) **5** FBF '19 grantees Edgar Knobloch (Physics, UC Berkeley) and Benjamin Favier (CNRS, Aix-Marseille Université) published a paper in the Journal of Fluid Mechanics revealing an extreme robustness of wall states in thermal convection in containers. A focus article published by a colleague in the same journal provides a commentary on the significance of the team's findings.











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Mairi McLaughlin

La Presse française historique

Histoire d'un genre et histoire de la langue

G A R NIE R



Overlay of all FEMA maps 2018 Montecito debris flow

s flow Extended flood hazard area

6



6 Ying Chik (Vanessa) Lee won first place in the ASFPM Foundation's 2021 Collegiate Student Paper Competition for her study "Using Historical Information to Inform Planning for Floods after Fires." Lee, a graduate student of Landscape Architecture and Environmental Planning at UC Berkeley, collaborated on the FBF-funded project project "From epic wildfires to epic flash-floods: Rethinking flood risk management in an era of extremes," led by Anna Serra-Llobet (Institute of International Studies, UC Berkeley) and Johnny Douvinet (Avignon Université). **7** FBF '17 grantee Mairi McLaughlin (French, UC Berkeley) published *La Presse française historique: Histoire d'un genre et histoire de la langue* (Classiques Garnier, 2021). The book is the first major study into the history of language in the French press, shedding light on the history of the genre of journalism and exploring what the study of historical periodicals can contribute to an understanding of the history of language. **8** Osmund Bopearachchi (Ecole Normale Supérieure Paris) delivered a lecture on the maritime mercantile cult of Bodhisattva Avalokiteśvara, as part of ongoing research related to his 2015 FBF





project "The Avalokitesvara Survey Project: Buddhism and Maritime Trade in Ancient Sri Lanka." **9** Berkeley PhD student Alexander Jaffe (Plant & Microbial Biology) published new research investigating the evolution of CPR bacteria, shedding new light on microbial diversity with FBF '18 project coordinators Simonetta Gribaldo (Institut Pasteur) and Jillian Banfield (Earth & Planetary Science / Environmental Science, Policy & Management, UC Berkeley). **10** FBF '16 grantees Dean Tantillo (Chemistry, UC Davis) and Fabien Gagosz (formerly CNRS, École Polytechnique, Palaiseau) published new research in Chemistry Europe (May 2021) on experimental and theoretical mechanistic studies on gold catalyzed organic reactions. **11** FBF 2017 Young Researcher awardee Dr. Maria Laura Delle Monache joins the UC Berkeley Department of Civil & Environmental Engineering as an Assistant Professor. Her research focuses on designing sustainable communities using new models and control strategies that leverage the latest technologies to improve the energy footprint and resilience of transportation systems.





NEW COLLABORATIONS

The FBF is pleased to support 17 projects in 2021-22, with awards totaling \$174,450



ARE ELECTION CAMPAIGNS GOOD FOR DEMOCRACY? AN ASSESSMENT OF THE 2022 FRENCH PRESIDENTIAL ELECTION

Gabriel LENZ, Department of Political Science, UC Berkeley Romain LACHAT, Centre de recherches politiques (CEVIPOF), Sciences Po Paris

This project will assess whether election campaigns are good for democracy. We will do so by testing whether voters learn the candidates' policy positions in the 2022 French presidential election. We will then ascertain whether voters who learn the candidates' positions shift their votes to candidates who share their preferences. We will also determine whether they adopt their preferred candidates' positions as their own.

BIOGEOPHYSICS FOR CLIMATE RESILIENT VITICULTURE

Susan HUBBARD, Earth & Environmental Sciences Area, Lawrence Berkeley National Laboratory

Myriam SCHMUTZ, Géoressources et Environnement, Institut Polytechnique de Bordeaux

The proposed project brings together 7 established scientists from 5 Berkeley/ Bordeaux institutions (Berkeley Lab, UC Berkeley, Bordeaux INP, Bordeaux Science Agro, INRAE French National Institute of Agriculture), each having worldrecognized expertise in environmental geophysics, soil-plant microbial ecology, soil physics, or viticulture. Through harnessing their collective expertise, and connecting and leveraging on their existing, synergistic projects, the proposed effort intends to launch a new, integrative subdiscipline of biogeophysics for climate-resilient viticulture and to develop and mentor 2 early-career scientists on a path in leading this new subdiscipline.

COUNTER-HEGEMONIC NARRATIVES IN EUROPEAN METROPOLIS: HERITAGE, IDENTITIES, SPACE

Stephen SMALL, Department of African American and African Diaspora Studies, UC Berkeley

Linda BOUKHRIS, Université Paris 1 - Panthéon-Sorbonne

This project will investigate counter narratives of colonialism in heritages tours in four major cities across Western Europe: Bordeaux, Barcelona, Edinburgh and Lisbon. Focusing on walking tours of geographic spaces associated with slavery, we examine how black and multi-racial populations challenge the dominant representation of Europe as having no legacies of slavery or racism.













Michael BUCKLAND, School of Information, UC Berkeley Olivier LE DEUFF, Sciences de l'information et de la communication, Université Bordeaux Montaigne

There was a golden period of innovation in the organization of recorded knowledge ("documentation") in France immediately after 1945 but now largely forgotten. This project will advance research on this activity by making original sources more accessible, with the application of existing digital humanities techniques, and through lectures and workshops. We will focus on ideas and writings of Robert Pagès, documentalist and social psychologist, 1919-2007.



DRUG REPURPOSING TO COMBAT A GLOBAL BACTERIAL ZOONOSIS

Renée TSOLIS, Department of Medical Microbiology and Immunology, UC Davis Anne KERIEL, Institut National de la Santé et de la Recherche Médicale (INSERM)/ Université de Montpellier

Our project aims to evaluate a new drug to treat brucellosis, an infectious disease transmissible to humans by certain domestic animals (cows or goats). This debilitating disease affects around 1 million new people each year. The advantage of this candidate drug is that it is already being used to treat another disease, which would significantly reduce the costs and validation time to be able to use it to control brucellosis.

GENETIC, GENOMIC, AND FUNCTIONAL EVOLUTION OF GENES ENCODING VIRAL-INTERACTING PROTEINS IN GREAT APES

Peter SUDMANT, Department of Integrative Biology, UC Berkeley Lucie ETIENNE, Centre International de Recherche en Infectiologie (CIRI), CNRS, ENS de Lyon

We propose a collaborative and integrative approach to identify and characterize selective signatures indicative of host-pathogen evolutionary conflict in diverse human and great ape populations and species. The Sudmant lab has extensive expertise in genomics and genetics and the Etienne Lab is expert in virus-host interaction and coevolution. Thus, collaboratively our groups are uniquely poised to address the critical scientific questions surrounding the adaptation of great apes to viral infection.

EXAMINING NUTRITIONAL THERAPIES IN MEDICAL EDUCATION

Kristine MADSEN, School of Public Health, UC Berkeley **Solenn THIRCUIR**, Laboratoire de biométrie et biologie evolutive (LBBE) / Université Claude Bernard Lyon 1

This project aims to analyze how medical schools can better educate new generations of health professionals in preventive medicine and nutrition. This research project will analyze the role of nutritional knowledge. We suggest that social science analysis may facilitate the integration of nutrition within biomedicine in the maintenance of health and wellbeing.







Diego PIRILLO, Department of Italian Studies, UC Berkeley Vincenza PERDICHIZZI, Institut d'études romanes, Université de Strasbourg

Drawing on the combined expertise of faculty and graduate students in the humanities at UC Berkeley and the University of Strasbourg, this project studies the "crossroads of knowledge" that connected the Republic of Letters in the age of the first globalization. Moving away from the traditional focus on capital cities, we turn our attention to smaller "contact zones," such as ports and frontier towns that enabled the circulation knowledge across linguistic, cultural and religious barriers. We will create an international research group that will meet in two workshops and present results both in print and digital form.

HIGH-TEMPERATURE MOLTEN SALT STUDIES

Raluca SCARLAT, Department of Nuclear Engineering, UC Berkeley Sylvie DELPECH, IJCLab, Université Paris-Saclay

This project is motivated by the pressing questions of sustainability, energy, and the environment. Molten salt nuclear reactors have the potential to provide a carbonfree source of electricity. Our collaboration will investigate the performance of reference electrodes for fluoride salts, and the relationship between fluoroacidity and the activity coefficient of solutes in the molten fluoride salts. The research collaboration will consist in the performance of joint experimental studies, the writing of joint publications, exchanges of experiences between the research groups and training of junior scholars, and dissemination of the results of the collaboration at our two institutions.

















Joanne EMERSON, Department of Plant Pathology, UC Davis Christina HAZARD, Laboratoire Ampère, École Centrale de Lyon / Université de Lyon

This project will leverage expertise in soil viromics and root-associated arbuscular mycorrhizal fungi to investigate fungal viruses in Mediterranean grasslands. The UC Davis team will visit Lyon to learn field and laboratory methods for identifying, collecting, and analyzing grassland fungi, including protocols for purifying fungal communities from roots and soil. Both teams will apply these approaches to their local grassland soils, which will be sequenced for the recovery of fungal viruses. The ECL team will then visit Davis to learn bioinformatics approaches for analyzing the sequencing data generated by the project, facilitating collaborative, comparative analyses of the fungal viruses recovered from both countries.



HOW CAN MENTORSHIP BOOST ASPIRING WOMEN ENTREPRENEURS?

Solène DELECOURT, Haas School of Business, UC Berkeley **Anne BORING,** Women in Business Chair, Sciences Po Paris

Most entrepreneurs are men. Using a large-scale field experiment, our project focuses on addressing the root causes of gender inequality in early-stage entrepreneurship. We experimentally test whether matching aspiring to established entrepreneurs can help fuel the entrepreneurial pipeline, and whether it can help decrease the gender gap in entrepreneurship. We consider this gap to be one of today's global challenges as it relates to diversity, equity and inclusion.



INFINITY: HISTORY, PHILOSOPHY, MATHEMATICS

Paolo MANCOSU, Department of Philosophy, UC Berkeley Marco PANZA, Institut d'histoire et de philosophie des sciences et des techniques (IHPST), CNRS / Université Paris 1 - Panthéon-Sorbonne

The project aims at making novel and far-reaching contributions to some of the most central areas of contemporary philosophy of mathematics and philosophy of probability as they relate to infinity. The envisaged results include, among other things, decisive contributions to: the history of our conceptions of infinity; neo-logicism in philosophy of mathematics; the nature of abstraction principles as infinitary principles yielding finitistic results; alternative conceptions of probability; the concept of extension; the sources of our knowledge of counting and probabilistic reasoning.

STATISTICAL RELATIONAL ARTIFICIAL INTELLIGENCE FOR ASSISTED ORCHESTRATION

Carmine Emanuele CELLA, Department of Music / Center for New Music and Audio Technologies (CNMAT), UC Berkeley Hélène-Camille CRAYENCOUR, CNRS / Université Paris-Saclay

The aim of this project is to contribute to the development of new strategies and technologies for music processing, and specifically for Assisted Orchestration (AO). The project builds on current work carried out in each team to assemble the necessary technical infrastructure, create tools, and conduct the analysis for the development of techniques for AO.

MAPPING COASTAL INTERTIDAL ECOSYSTEM PRIMARY PRODUCTION: COUPLING REMOTE SENSING AND ATMOSPHERIC EDDY COVARIANCE

Dennis BALDOCCHI, Department of Environmental Science, Policy & Management, UC Berkeley **Vona MÉLÉDER**, Département des Sciences de la Vie, Université de Nantes

Intertidal coastal ecosystems (i.e. mudflats, salt marshes, seagrass beds, etc.) are present all over the world, yet are often neglected in the global carbon budget, though these ecosystems are increasingly recognized to be as productive as tropical forests. Estimating the actual carbon uptake by these ecosystems is a challenge that has to be tackled, which is the objective of this project. Its main innovation resides in coupling remote-sensing with CO₂ fluxes measured by atmospheric eddy covariance, to map at the ecosystem level the gross primary production (GPP), corresponding to the carbon uptake by vegetation. This project will allow us to estimate for the first time the contribution of these ecosystems to the global carbon cycle and predict ecosystem dysfunction consequences.

UNDERSTANDING WILDFIRES

Peter BOSSELMANN, Department of City and Regional Planning, UC Berkeley **Catherine RANNOU,** École nationale supérieure d'architecture Paris-Val de Seine

Wildfires have become a reoccurring phenomenon in the South of France and in California. Our proposed work focusses on the boundaries of fires between suburban development and fire prone terrains that are covered by forests, grassland or chaparral in three CAL-FIRE districts within the San Francisco Bay Area. Our team will conduct ten-day residences in each of the three districts to record and communicate the conditions in burn-out areas of recent fires through images, drawings and text. The objective is to create a foundation for public policy on urban fringe developments in areas with high risk of wildfires.









PROBABILITY AND MEANING

John MACFARLANE, Department of Philosophy, UC Berkeley Paul EGRÉ, Institut Jean Nicod, CNRS / Département de philosophie, Ecole Normale Supérieure

Our objective is to foster collaborative work between UC Berkeley and the Institut Jean-Nicod through two joint workshops, one in Berkeley, one in Paris. The workshops will be centered on the discussion of the increasing role that probabilistic modeling is taking in our understanding of linguistic meaning. Researchers at both institutions have been centrally interested in different aspects of this topic, and we think it would be fruitful to pool our thinking on complementary issues.



TRACER-INFORMED CRITICAL ZONE MODELLING TO CONNECT WATER AGES WITH HYDROLOGICAL RESOURCES AND SOLUTE EXPORTS

Matthias SPRENGER, Earth & Environmental Sciences Area, Lawrence Berkeley National Laboratory Sylvain KUPPEL, IRD / Géosciences Environnement Toulouse

The project aims to reveal how water, and the chemical compounds it contains, are stored and released in the mountainous region of the Upper Colorado River. We will use the extensive sets of field observations collected for several years by the Lawrence Berkeley National Laboratory in the East River headwaters, in a novel combination with state-of-the-art numerical simulations of the processes through which water, plants and underground chemistry interact in these landscapes. In addition to advancing our knowledge on water resources, the proposed data-model integration will serve as an example of communication between national networks of watershed observatories, between field hydrologists and modelers, and will motivate science- and networking-oriented discussions for early-career scientists in a workshop we will lead in 2022.

Funded projects by area of research



IMAGE CREDITS

Cover: Sather Gate, UC Berkeley // Photo by Keegan Houser, courtesy of UC Berkeley Office of Public Affairs p. 6 Winter sunset in a blue oak woodland, California. Photo by Leander Anderegg; Greenland Ice Sheet. Photo by Christine Zenino under CC BY 2.0.

p. 7 Glasswing butterfly. Photo by Nipam Patel; Visualizations of temperature fluctuations in cylindrical containers, from Favier/Knobloch, "Robust wall states in rapidly rotating Rayleigh-Bénard convection," in J. Fluid Mech. (2020), vol. 895, R1, doi:10.1017/jfm.2020.310; Image of an NLRP3 receptor protein, from Wikimedia Commons

p. 8 Image showing extended flood hazard area (overlay of FEMA maps produced over the last 50 years and the 2018 Montecito debris flow footprint), by Vanessa Lee

p. 9 Figure illustrating phylogenetic relationships and metabolic similarity among Candidate Phyla Radiation bacteria, from Jaffe/Gribaldo/Banfield, " The rise of diversity in metabolic platforms across the Candidate Phyla Radiation," BMC Biology 69 (2020), open access; Figure illustrating results of DFT (B3LYP/6-31+G(d,p),LANL2DZ(Au)) calculations on a model of catalyst transfer sequence, from Tantillo/Gagosz, " On the Mechanism of Au-Catalyzed Enynamide-yne Dehydro-Diels-Alder Reactions: An Experimental and Computational Study," Chemistry Europe (4 May 2021), https://doi. org/10.1002/chem.202100580; Photo of Maria Laura Delle Monache, courtesy of Civil & Environmental Engineering, UC Berkeley

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The project has deepened our working relationship and also enhanced or established relationships for all who have participated in it. We are certain that these connections will bear fruit in other contexts in the years ahead.

SUPPORT

OUR

WORK

- TODD HICKEY (Classics, UC Berkeley) and JEAN-LUC FOURNET (Collège de France / EPHE)

This has been an invaluable experience for the junior researchers involved and it has directly facilitated the establishment of larger-reach projects between Lyon and Berkeley.

- MARY FIRESTONE (Environmental Science, Policy & Management, UC Berkeley) and GRAEME NICOL (Laboratoire Ampère, Université de Lyon)

The France-Berkeley Fund is committed to advancing innovative research and international exchange across the humanities and sciences. Help ampllify our work by making a gift to our grant fund. Gifts to the FBF help sustain cutting-edge collaborations that bring together faculty, researchers, and junior scholars from UC Berkeley and institutions throughout France.

fbf.berkeley.edu



The France-Berkeley Fund has been fantastic support for the initiation of this research trajectory. Without it, this project could not have proceeded in this collaborative fashion. It has advanced the research career of a Berkeley junior faculty member, provided valuable training for a Berkeley PhD, and led to an academic research position for a recent French PhD. These collaborative relationships will be sustained into the future.

- NICHOLAS SWANSON-HYSELL (Earth & Planetary Sciences, UC Berkeley) and YVES GODDÉRIS (Observatoire Midi-Pyrénées, CNRS / Université Toulouse)

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