



 **LIVING EARTH**  
**COLLABORATIVE**  
CENTER FOR BIODIVERSITY



SPRING 2022 **NEWSLETTER**



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## Director's Letter

The Living Earth Collaborative is a center for biodiversity built from a partnership among Washington University, the Missouri Botanical Garden and the Saint Louis Zoo.

Since 2018, the Living Earth Collaborative has funded 29 projects involving 11 St. Louis-area institutions. Within Washington University, investigators hail from six schools: Arts & Sciences, the Brown School, the McKelvey School of Engineering, Olin Business School, the Sam Fox School of Design & Visual Arts and the School of Medicine.

This periodic newsletter is aimed at keeping you informed about progress in our collaborations, notable research publications, and news about the great people who are part of the Living Earth Collaborative.

### **Jonathan Losos**

William H. Danforth Distinguished University Professor  
Washington University in St. Louis





## Living Earth Collaborative announces 2021 seed grant recipients

This is the fourth year that the Living Earth Collaborative has awarded seed funding to support biodiversity-focused projects. The 2021 projects and their investigators are:

- **Biodiversity of freshwater mussels of the Upper Sangamon River (Illinois):** Community science in action. Danelle Haake (National Great Rivers Research and Education Center); Sarah Douglass (Illinois Natural History Survey); Christy Edwards and Bob Coulter (Missouri Botanical Garden); Edward Spevak (Saint Louis Zoo); and Bruce Colravy (Upper Sangamon River Conservancy)
- **Expanding the toolset for chelonian conservation: Understanding the diversity, distribution and dynamics of *Terrapene microbiomes*.** Fangqiong Ling (Washington University, McKelvey School of Engineering); and Maris Brenn-White, Kathleen Apakupakul and Sharon L. Deem (Saint Louis Zoo)
- **Forest Park Living Lab:** Exploring the biodiversity and natural history of one of the world's great parks. Joseph Steensma (Washington University, Brown School); David Webb and Carolyn Cosgrove Payne (Washington University, Environmental Studies program in Arts & Sciences); Anthony Dell (National Great Rivers Research and Education Center); and Amy Witt (Forest Park Forever)
- **Origin and diversification of the flowering plants of the Gulf of Guinea archipelago.** Patricia Barberá and Tariq Stévant (Missouri Botanical Garden); Joan Garcia-Porta and Michael Landis (Washington University, Department of Biology in Arts & Sciences); and Nathan Muchhala (University of Missouri-St. Louis)
- **Páramo biodiversity farms:** A collaborative conservation project (Colombia). Iván Jiménez (Missouri Botanical Garden) and Derek Hoferlin (Washington University, Sam Fox School of Design & Visual Arts)
- **Socioeconomic and cultural adaptation to biodiversity loss and climate change:** Analysis and intervention efficacy study in three Madagascar subsistence communities. Armand Randrianasolo, Nivo H. Rakotoarivelo and Fortunat Rakotoarivony (Missouri Botanical Garden) and Judi McLean Park (Washington University, Olin Business School)

Learn more about the seed grant projects on our website, [livingearthcollaborative.wustl.edu/grants-funded-spring-2021](https://livingearthcollaborative.wustl.edu/grants-funded-spring-2021)



## A tale of two forests could reveal path forward for saving endangered lemurs

*Black-and-white ruffed lemurs and diademed sifakas are the focus of a Living Earth Collaborative effort in Madagascar*

In one Madagascar forest, the trees teem with lemurs. In another forest just 150 miles away, the last few individuals of a small local population may soon be lost.

To figure out how to best support these two endangered species—black-and-white ruffed lemurs and diademed sifakas—scientists at Washington University are joining with researchers at the Saint Louis Zoo and the Missouri Botanical Garden, as well as with Madagascar-based partners, for an innovative research effort under the Living Earth Collaborative. Through the Eric P. & Evelyn E. Newman Foundation, Washington University Board of Trustees Chair Andy Newman established the Newman Madagascar Research Fund, which will be critical to the project’s success.

The work has begun with intensive field observations focused on the daily activities, living requirements, and genetic diversity of lemurs in the Betampona Natural Reserve, near the island country’s northeast shoreline. Next up is a similar inventory at the Vohibe Forest, in eastern Madagascar.

“No two sites are the same,” said Emily Wroblewski, who leads the project along with colleague Krista Milich, both assistant professors of anthropology in Arts & Sciences at Washington University. “And when you’re dealing with an endangered species, every individual and every site counts.”

For the black-and-white ruffed lemur, *Varecia variegata*, the key number to count is 45. That’s how few individual lemurs of this species might remain at the more isolated forest site, Betampona. The diademed sifaka, *Propithecus diadema*, could be down to only 19 individuals in this location, based on recent estimates.

The Madagascar Fauna and Flora Group, a nongovernmental organization formed by a consortium of zoos and other institutions, including the Saint Louis Zoo and the Missouri Botanical Garden, identified Betampona as a priority location more than 30 years ago.

“Having a Madagascar-based team is essential to the project,” said Fidy Rasambainarivo, affiliate scientist with the Saint Louis Zoo WildCare Institute and its Center for Conservation in Madagascar.

To reach our conservation goal for Vohibe Forest’s biodiversity, collaboration with people studying lemurs is important,” added Armand Randrianasolo, Madagascar program curator for the Missouri Botanical Garden. “Lemurs are a vital part of the Vohibe Forest ecosystem.”

Read more at [source.wustl.edu/2021/03/a-tale-of-two-forests-could-reveal-path-forward-for-saving-endangered-lemurs](https://source.wustl.edu/2021/03/a-tale-of-two-forests-could-reveal-path-forward-for-saving-endangered-lemurs)



Krista  
Milich



Emily  
Wroblewski



“And when you’re dealing with an endangered species, every individual and every site counts.”

## Buzz of success for backyard bee biodiversity effort

The inaugural year of the Shutterbee Community Science Program, a Living Earth Collaborative seed grant recipient, was a serendipitous success.

“With a global pandemic, many conservation-minded folks found themselves spending more time at home, looking for ways to engage with nature and the broader community,” said Nicole Miller-Struttmann, associate professor of biology at Webster University.

During 2020, researchers provided virtual training and support to 168 community scientists who wanted to learn how to monitor the bees in their backyards. The community scientists in turn submitted over 8,000 bees to the Shutterbee iNaturalist project. As of 2021, they have recorded over 20,000 total individual bee observations.

“We will continue to track human and bee behaviors alike,” Miller-Struttmann said. “Preliminary results are promising, suggesting that photographic surveys of large bee species track patterns documented via traditional netting methods.”

Ultimately, this project will inform best practices in urban bee conservation and deepen understanding of what influences conservation-related behavioral change.

Learn more at [news.webster.edu/2021/shutterbee-bee-photography-project.php](https://news.webster.edu/2021/shutterbee-bee-photography-project.php)



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## Andean forests have high potential to store carbon under climate change

The Andes Mountains of South America are the most species-rich biodiversity hotspot for plant and vertebrate species in the world. But the forest that climbs up this mountain range provides another important service to humanity.

Andean forests are helping to protect the planet by acting as a carbon sink, absorbing carbon dioxide and keeping some of this climate-altering gas out of circulation, according to a study published by scientists including researchers supported by the Living Earth Collaborative.

The study in the journal *Nature Communications* draws upon two decades of data from 119 forest-monitoring plots, including data from the Missouri Botanical Garden's Madidi Project.

“Based on the information that we have, Andean forests are a carbon sink—capturing more carbon than they emit,” said J. Sebastián Tello, an associate scientist at the Center for Conservation and Sustainable Development at the Missouri Botanical Garden. Washington University’s Jonathan Myers and William Farfan-Rios also contributed to the study.

“The amount of carbon that is stored in the aboveground biomass in the stems and leaves of trees is actually increasing through time, potentially offsetting some of the carbon dioxide emissions that are released to the atmosphere,” Tello said.

Read more on The Source.

[source.wustl.edu/2021/04/mountain-high/](https://source.wustl.edu/2021/04/mountain-high/)

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Yusan  
Yang

## From strawberry poison dart frogs to Trinidadian guppies

Yusan Yang is a Living Earth Collaborative postdoctoral fellow. At Washington University, Yang is exploring how genetic and environmental influences on mating behavior modulate ecological and evolutionary processes in Trinidadian guppies.

Yang earned her PhD at the University of Pittsburgh, where she studied sexual selection and phenotypic divergence in the strawberry poison dart frog (*Oophaga pumilio*).

“You don’t always find things that are the same as your hypotheses and that’s okay because that’s sometimes how you find new things or new directions in your research,” Yang said. “For example, poison dart frogs have really strong color biases in terms of their behavior, so when the female is choosing a mate, she pays attention to color, and

when the males are fighting, they pay attention to color, too.

“We actually discovered that this behavior did not come from their genetics but instead comes from learning,” she said. “So when the tadpoles are being fed by their mother, they imprint on their mother’s color, and that’s how they learn their color biases. I think that’s one of the things that is surprising but also really cool.”

- Read the full story on the Washington University Department of Biology website. [artsci.wustl.edu/ampersand/strawberry-poison-dart-frogs-trinidadian-guppies-postdoc-spotlight-yusan-yang](https://artsci.wustl.edu/ampersand/strawberry-poison-dart-frogs-trinidadian-guppies-postdoc-spotlight-yusan-yang)
- Watch Yang describe her research on the Living Earth Collaborative YouTube site. [youtube.com/watch?v=1eCYcBkO5G8&ab\\_channel=LivingEarthCollaborative](https://youtube.com/watch?v=1eCYcBkO5G8&ab_channel=LivingEarthCollaborative)



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## Living Earth Collaborative weekly seminar series

Join us online for our weekly seminar series on Thursdays at 4:00 pm CST, or browse through a year's worth of previously recorded talks on our YouTube channel.

[livingearthcollaborative.wustl.edu/seminar-series](http://livingearthcollaborative.wustl.edu/seminar-series)

## Find out more

The Living Earth Collaborative is dedicated to advancing the knowledge of biodiversity and ensuring the future of Earth's species in their many forms. Get involved and learn more:

 @LECBiodiversity on Twitter

 @LivingEarthCollab on Instagram

[Livingearthcollaborative.wustl.edu](http://Livingearthcollaborative.wustl.edu)

To make a gift, visit [gifts.wustl.edu](http://gifts.wustl.edu) and indicate that you want to support the Living Earth Collaborative. To discuss giving options, please contact Julianne Smutz, Senior Associate Director of Advancement, at (314) 935-5148 or [jsmutz@wustl.edu](mailto:jsmutz@wustl.edu).