



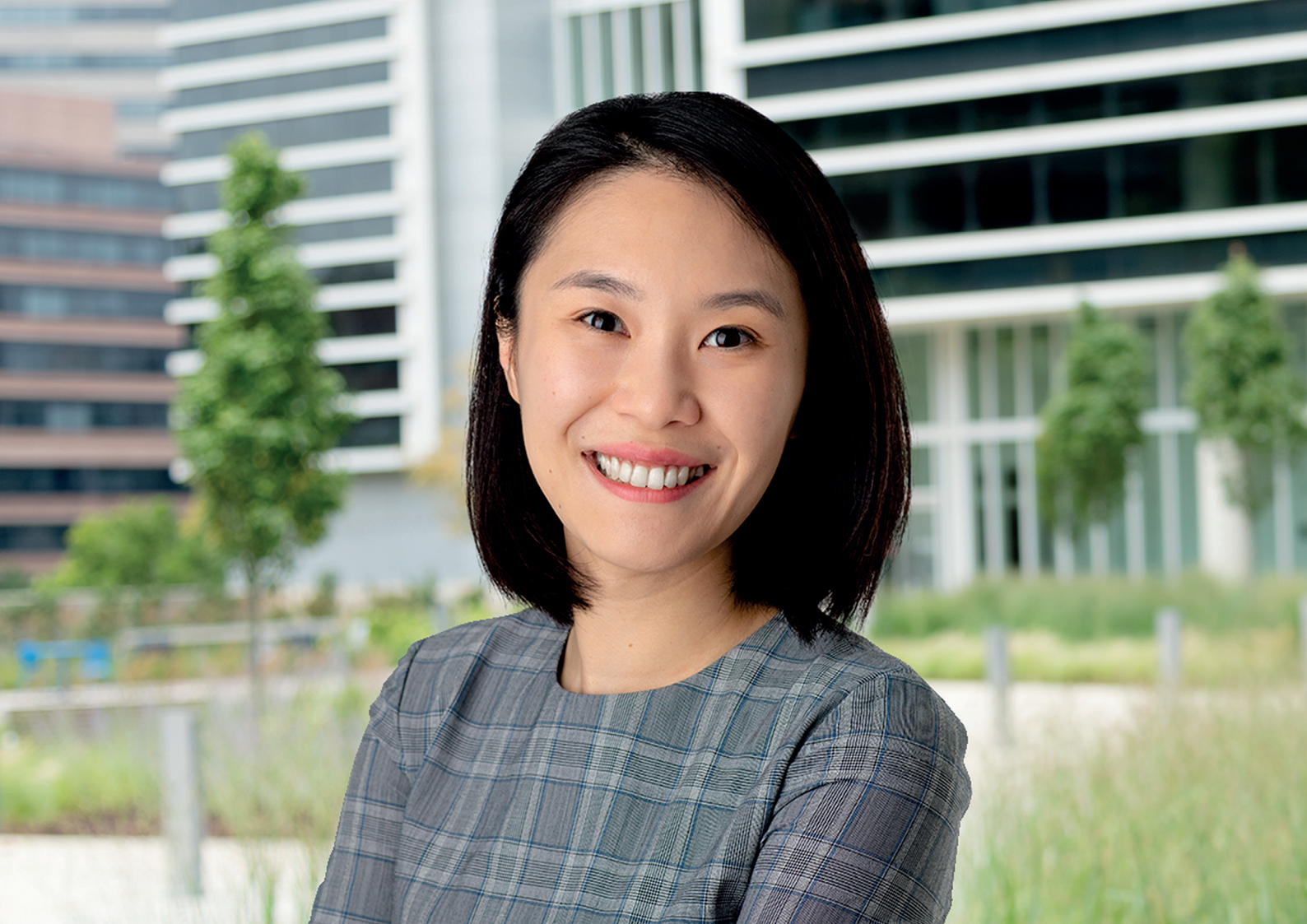
Laura Hendriks – Art and Conservation Sciences – Branco Weiss Fellow since 2020

Color-Specific Radiocarbon Analysis for Dating Cultural Heritage Objects

As a Branco Weiss Fellow, Dr. Laura Hendriks is working on the revolutionary application of radiocarbon dating to organic pigments and dyes in cultural heritage objects. To determine the ^{14}C signature of organic dyes, Dr. Hendriks combines dye analysis with compound-specific radiocarbon analysis. This innovative methodological approach will provide new routes to assessing the historical context of colored objects and information about trade routes and dyeing practices. Radiocarbon dating requires the physical removal of material from artworks. This, of course, is undesirable, because it damages the artworks, and is usually considered only as a last resort. Thanks to technological advances in ^{14}C analysis, microgram quantities of carbon samples are now sufficient to provide a ^{14}C date, and as such facilitate the development of new strategies for dating. This means that dating can be applied to binders and pigments in artworks. The methods that have emerged thanks to Dr. Hendriks's project open up new unexplored research possibilities in the field of cultural heritage science.

Do you have an unconventional research idea and would you like to become part of the Branco Weiss community? Have a look at our website and submit your application by January 15, 2024.

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Ai Ing Lim – Immunology – Branco Weiss Fellow since 2021

The Role of Maternal Parasitic Worms in Preventing Offspring Immune Disorders

As a Branco Weiss Fellow, Dr. Ai Ing Lim studies the relationship between maternal exposure to helminths (parasitic worms) and the long-term development of the immune system in the offspring. She hypothesizes that the elimination of helminths, evolutionary partners of humans that were prevalent in the microbial environment of our ancestors, is a major factor in the increase of allergies and autoimmune diseases. She proposes a “prenatal hygiene hypothesis” whereby partnerships between mothers and helminths could direct immune development in their offspring toward improved immune regulation, thereby reducing inflammation-related diseases. Using a variety of methods, Dr. Lim is examining the effects of maternal worm infections on offspring immunity. She is also investigating the role of the microbiota, lactation, and epigenetic inheritance in this complex dialogue between the mother’s immune system and that of the offspring. At the interface of immunity, infection, and developmental biology, this research holds the potential to redefine approaches to the prevention and treatment of immune disorders.

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Renato Morais – Ecology – Branco Weiss Fellow since 2021

How Seascapes Shape Tropical Reef Productivity

Tropical reefs make up less than 0.1 percent of the ocean floor. Although they form in nutrient-poor waters, they are amazingly productive. They have provided food for people for thousands of years and continue to sustain the livelihood of more than 6 million reef fishers and their families. How can we explain this apparent paradox? It is a challenge for researchers to understand reef productivity. Some studies aim to capture global patterns, while others focus on investigating tiny reef areas. As part of his Branco Weiss Fellowship, Dr. Renato Morais aims to determine what central role the marine environment plays in reef productivity. To do this, he combines methods from different ecological and oceanographic disciplines. He determines the energetic footprint of biomass in relation to the surrounding seascape. The project will show how internal and external pathways affect biomass production in reefs. In the context of global changes that threaten ecosystems, Dr. Morais's work is crucial. It provides insights for the sustainable management of tropical fisheries in a rapidly changing world.

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Michael Mühlebach – Computer Science – Branco Weiss Fellow since 2018

A Dynamic Systems Perspective on Optimization Algorithms

Dr. Michael Mühlebach's research analyzes and improves large-scale optimization algorithms. Optimization is central to science and engineering, enabling new technological advances such as computer-aided diagnosis tools that support medical doctors, air traffic control systems, self-driving cars, and personalized user recommendations on digital platforms. Dr. Mühlebach develops analogies between optimization algorithms and physical and dynamic systems to provide important insights into existing algorithms and enable new algorithms that can handle constraints in computationally efficient ways. While his research is of a fundamental nature, it is often evaluated on real-world systems such as traffic prediction systems for cities, a ping-pong-playing robot that is actuated by pneumatic artificial muscles, underactuated balancing robots, magnetic manipulation systems, and flying robots.

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Aurore Schwab – Sciences of Religions – Branco Weiss Fellow since 2022

Unearthing the Spiritual Roots of the UN's Sustainable Development Goals

Branco Weiss Fellow Dr. Aurore Schwab explores the potential impact of the United Nations Sustainable Development Goals (SDGs) on society. It is possible to consider the foundations, emergence, and dissemination of the SDGs from the perspectives of the global history of religions. Historically, religions have provided a framework for societal functions by producing norms, shaping emotions, and promoting coordination and justice. Modern nation-states compete for the dominant model of articulating political and religious mechanisms. Challenges such as environmental change, however, require global cooperation. Against this backdrop, the SDGs adopted in 2015 can be fruitfully analyzed as a potential “planetary religion.” They involve Earth as a superhuman actor and revive global myths and rites. Dr. Schwab combines methods from religious studies with those from other disciplines to explore the theoretical underpinnings of the SDGs and their implications for nation-states and religious organizations to promote a global understanding of sustainable development.

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