A SYMBIOTIC YEAR

HASSAN SALEM

Hassan is an incoming Max Planck Research Group Leader at the Institute for Developmental Biology in Tübingen. He studied Biology at Earlham College before joining the Max Planck Institute for Chemical Ecology for his Ph.D. In 2016, Hassan joined Emory University as an Alexander von Humboldt Postdoctoral Fellow to study the role endosymbionts play in the nutritional ecology of leaf beetles. At the conclusion of his College for Life Sciences Fellowship at the Wissenschaftskolleg, he was awarded a Smithsonian Biodiversity Genomics Fellowship to fund his stay in Ted Schultz's laboratory at the National Museum of Natural History in Washington, D.C. He has an inordinate fondness for asking why mutualisms evolve and how. Having researched animal-microbe symbioses across multiple biological scales, Hassan's interests span the genetic underpinnings to the ecological consequences of cooperation between species. His findings are published in *Proceedings of the Royal Society* and *Cell*. In launching his laboratory, he aims to characterize the currencies defining folivore-microbe symbioses and describe the developmental profiles contributing to their persistence. – Address: Department of Biology, Emory University, 1510 Clifton Road, Atlanta, GA 30320, USA.
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Almost a year has gone by since I wandered up to Wallotstraße 19, bags in tow, jetlagged and very disoriented by how green this enclave in Berlin appeared. For years I had heard, of course, about the Wissenschaftskolleg from colleagues and mentors who have spent months, weeks, or merely hours in Grunewald and about the synergy this place afforded for them to think, read, and write. I immediately searched for this energy as I took my

first steps up the *Hauptgebäude* frantically looking for Vera Pfeffer, too keen to initiate my Fellowship within the storied walls of the Wissenschaftskolleg. I imagined my time in Berlin sequestered away in the Weiße Villa delving into the journals and books that always seemed relegated to a folder in my head titled "Later". I started my Fellowship eager to explore questions and hypotheses that I never seemed to have the time or space to develop, only to be surprised by the outsized role this community of Fellows and Wiko staff members ended up playing in my growth and seasoning as an academic, collaborator, and friend. I developed my hypotheses, worked on my theory, and streamlined my methods. But this was not because of the time I cordoned off for myself; instead, rather explicitly, it was through the generosity others displayed with theirs.

Advanced Beginners

A few weeks leading up to the official start of the academic year, I joined an aliquot of incoming Fellows in Villa Jaffé in an attempt to improve my German through the intensive language program. Sitting across the table from Başak Tuğ and David Armitage in a course generously dubbed "Advanced beginners", we spent hours each day struggling to paint the most basic portrait of our lives before Wiko. Under the guidance of our course instructor, Nadjia Fügert, we restricted our use of English to jumpstart our German. Seared into my memory are the confused looks and laughs I extracted from my classmates as I uttered nonsensical sequences like *Ich bin Entomologe, aber ich liebe auch Kartoffeln*. But in all honesty, those are some of the truest statements I could make! Shielded from the pretense afforded by communicating in a native tongue, we bonded over our (my) fruitless efforts to properly deploy *die*, *der*, and *das*. The language course, while instrumental for our new life in Germany, served as the perfect metaphor for the start of our year in Berlin. We were all in this together … as advanced beginners.

The Kolleg

I arrived at Wiko three years removed from a doctoral degree. I had some idea of the logical next step at the conclusion of my nomadic postdoctoral years, but a hazier view of the exact questions that would inspire and guide the start of my laboratory at the Max Planck Institute Tübingen. A motivating factor behind my application to join the ranks of Wiko was a desire to crystalize a number of core questions that would usher in a new

phase in my development as a principle investigator and to develop a range of multidisciplinary tools to answer them. As I settled for the first Kolleg lunch alongside fellow biologists, a theoretician, and a psychologist, I wondered how Ulrike Pannasch would manage to integrate us all into a cohesive academic unit and the types of discussions we would all share during our months together. But she did manage. Exceptionally so. Outside of our daily independent schedules to "Gain Time to Think", we were engaged through leadership courses and development workshops to grapple with the common challenges facing junior researchers across disciplines and fields. From insights into the current funding landscape to navigating the hiring process, we were afforded an opportunity to grow as early-career scientists and shift from learning on the fly to concentrated learning. This program allowed me to reframe my research and the questions behind it for a broader audience, all while ensuring that a platform still exists to engage specialists in my field through invitations to campuses. In hosting Toby Kiers of the Vrije Universiteit Amsterdam in Berlin, we established a collaboration and articulated the framework of a grant proposal that is currently developing.

Symbioses

Symbiosis is what I study. In its broadest terms, it is the long-term living together of unlike beings. This, in my view, aptly captured the nested ecosystem that became of Wiko during the 2018/2019 academic year: novelists breaking bread with biologists, while historians share afternoon tea with sociologists. All wondering what we ever did to deserve Dunia Najjar's feasts.

The vibrancy of this community was inspiring for a junior member to witness and a reminder of why former Fellows insist in unison to "go if you can". Nothing comes close to the energy surrounding a Tuesday morning in the Colloquia Room or the wonder of watching time fly during dinner on Thursday because of the charming company and the chance to reflect on the week that was.

Back in 2017, I proposed to work on a project aimed at understanding why beetles engage in such a diverse range of symbioses with microbes and plants. I arrived at Wiko with the aim of developing the theoretical and empirical framework to test why certain lineages are more predisposed for a symbiotic lifestyle than others. One of the early findings from this analysis is that dietary specialization, more than any other factor, renders the insect more prone to housing a beneficial microbe. From discussions with Judith

Bronstein, Amanda Gibson, Siobhan O'Brien, Michael Wade, and Thomas Lewinsohn on the theory behind the origin and evolution of mutualisms, to discussions with Nancy Moran and Thomas Bosch about the mechanistic basis of how these interactions are maintained, my time in Berlin felt richer and more transformative than I ever expected from a research stay anywhere. In reflecting on my time at Wiko and its community, I am grateful for having lived with so many extraordinary, unlike beings. All of whom will forever be part of my symbiotic year in Berlin.