CAREERS

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CONSULTING

Juggling act

US scientists who take on consultancy can gain experience, supplement their income — and face logistical challenges.

BY AMANDA LEIGH MASCARELLI

When Çağan Şekercioğlu had an interview for a position at the University of Utah in Salt Lake City in 2009, he faced a choice: play it safe and focus purely on his academic accomplishments and scientific publications, or openly discuss his environmental consultancy work as the founder and unpaid director of KuzeyDoğa, a non-governmental organization (NGO) based in Kars, Turkey.

Şekercioğlu suspected that his prospective colleagues might see his grass-roots conservation activity as a distraction from publishing high-impact papers and pursuing grants for his academic work. And traditional academic disciplines such as biology do not always value environmental work, he says. But Şekercioğlu decided to take the gamble and emphasize his voluntary work, hoping that the applied research involved would give him an edge. "I thought, 'Well, this is a big part of my identity'," he says. The gamble paid off: Şekercioğlu is now an assistant professor of biology at the University of Utah. "It's not enough for me just to publish scientific papers. As a conservation biologist I must do actual conservation that leads to conservation of species," he says. Şekercioğlu now believes that the consulting experience helped him to land the job, and he has been pleasantly surprised by the support he has received from his academic colleagues.

Although some, like Şekercioğlu, may believe in a cause and a project enough to work on it for free, many US academics get paid for consultancy — and it can be lucrative. They often find that these side jobs allow them to branch out in ways that enrich their own research. And those who have chosen to consult full time say that it has given them diverse and satisfying opportunities. But being a consultant can be fraught with complexities — from the need to avoid actual or perceived conflicts of interest to managing one's time and taxes and navigating the delicate dynamics of relationships with faculty members and graduate students.

COMMON PRACTICE

Strictly speaking, consulting consists of paid work done on a contractual basis for an agreed period of time. But in practice it covers a wide range of activities, including voluntary work. Many scientists, for example, sit on scientific boards or on the boards of directors of large companies or organizations. Consultancy pay varies widely, and usually generates anywhere from US$75 to $300 per hour. For researchers who regularly act as consultants, the extra income can be as much as 30% of their main salaries.

Academics often rent out their expertise under consultancy arrangements. During the Deepwater Horizon oil spill in 2010, numerous researchers were hired by BP (see *Nature* **466,** 538; 2010) and the US National Oceanic and Atmospheric Administration (NOAA) to collect samples and to analyse data and environmental effects. Academic researchers are often called on to act as expert witnesses in trials, for example, to interpret forensic evidence or to assess damage to health or the environment from a chemical accident.

Consulting opportunities span all scientific disciplines, but certain fields and institutions receive more funding from industry than others, which can lead to more consulting opportunities, says John Humphrey, head of the geology and geological engineering department at the Colorado School of Mines in Golden. "The funding automatically puts us in contact with people in industry; they see what we do, and ▶

we're working with them anyway," he says. Companies needing an expert interpretation of data, or wanting to use a technique for which they don't have the necessary analytical equipment, will often contact scientists that they know for a consultation, adds Humphrey.

SEEKING AND FINDING

Those interested in seeking out consultancy work have several avenues to explore. For example, the American Chemical Society and the American Institute of Chemical Engineers sponsor an online forum called the Chemical Consultants Network (chemconsultants.org), a non-profit organization that brings together some 500 chemists and chemical engineers from the United States and elsewhere, allowing them to publicize their consultancy services and expertise. A similar network, the CECON Group (cecon.com), acts as a broker for scientists, engineers and expert witnesses. And researchers worldwide have become involved with consultancy through innovation challenges such as those hosted online by InnoCentive and IdeaConnection (see *Nature* **469,** 433–435; 2011).

Academic scientists who consult on a regular basis say that the jobs often develop through word of mouth and networking. But the practice can be more institutionalized. The Florida Institute of Technology in Melbourne has its own consultancy department, Florida Tech Consulting, which acts as a sort of "clearing house for consulting expertise", says Joel Olson, a chemist at Florida Tech. A company in need of a consultant with specific expertise contacts the department, which provides a list of candidates.

Shelley Johnson, associate director of Florida Tech Consulting, estimates that about a quarter of Florida Tech's faculty members sometimes consult, and the number is growing. Johnson says they recognize the appealing prospect of earning significantly more than their regular salary.

"They're quick little projects where I get to learn about some new area of science."

Consultancy often requires a skill set beyond typical lab or field research. For example, Daniel Cooper, president of Cooper Ecological Monitoring, an environmental consultancy in Los Angeles, California, sometimes finds himself accessing antiquated field notes at museums and surveying railway reports. He occasionally advises clients on habitat restoration projects, which might entail looking at old maps and photos to get a sense of the area's native vegetation and topography. He has also designed an 'eco audit' to help a coffee-importing company verify that the coffee it is buying is grown sustainably, and is helping a city to clear brush in fire-prone areas without disturbing sensitive plants and nesting birds.

The business side of things is important too: operations such as Cooper's require that the consultant does everything from drawing up proposals and estimates of the scope of work to invoicing the clients and applying for renewal of permits to survey endangered species. Cooper also often has to decipher archaic names of plant species and communicate with non-English-speaking maintenance crews to convey such information as why it is important not to cut down branches that are home to nesting birds. "You're really a liaison between the natural world and the 'realities' of getting work done," says Cooper.

T. TAZEGUN

Çağan Şekercioğlu, a biologist at the University of Utah, also runs two environmental organizations in Turkey.

SAFE PRACTICE

Liability insurance is needed to protect consultants from lawsuits, says Cooper. Responsibility for it varies: Florida Tech's contract automatically shields scientists, says Olson. Cooper notes that two of his recent projects required that he get his own professional liability insurance, which he estimates will cost him an extra $1,000 a year (although one client offered to cover the cost). Registering as a 'limited liability company' — or one's country's equivalent — confers some protection. John Newport, a full-time chemistry consultant with Chemventive in Chadds Ford, Pennsylvania, recommends incorporating liability limits up front in the contract with the client. Some part-time consultants, however, say they have never purchased insurance.

Unconventional tasks and protections are not the only challenge for the consultant scientist. The work can also clash with the culture of a researcher's home institution, creating strain among colleagues. One oceanographer, who prefers to remain anonymous owing to concerns that some of his colleagues would not approve of his consulting activities, notes that in academia, consultancy can sometimes create inequities with other faculty members. "In the system I'm in, the university is set up to be fair in terms of promotions and pay," he says. "When people are doing consulting, which can be a significant source of income, it's not something we openly talk about. Many academics believe in the purity of academic pursuit, and their perception is that consulting is tainted." This researcher, who began working as a consultant for NOAA during the 2010 oil spill, emphasizes that faculty members must avoid letting consultancy interfere with the work of their graduate students or postdoctoral researchers. For instance, data collected during consultancy for the government or a company are often kept private, and researchers must make sure that these data aren't vital to anyone else's work. Companies or businesses should not have the power to interfere with publication of a student or postdoc's research, he says. "If somebody's career could potentially be impacted in a negative way, then there's a firm line."

Most universities require that faculty members disclose, in writing, the nature of their consultancy work and the time they devote to it. At the Colorado School of Mines, faculty members are allowed to spend up to eight hours a week on consultancy work. "You don't want to be in a position where someone is questioning whether you're getting your principal job done," says Humphrey. He estimates that up to a third of faculty members in the department of geology and geological engineering do some form of consultancy.

When Şekercioğlu, who now runs two Turkish environmental NGOs, wraps up his university day, he begins his consultancy work — coordinating with his staff, collaborators, students, volunteers and other partners in Turkey. "Often you'll find me on Skype or the phone after midnight," says Şekercioğlu.

Humphrey has worked on several international consultancy assignments in central Asia, usually helping multinational oil companies to understand the geology of oil reservoirs. But juggling consultancy and a full-time faculty position can be challenging. "You have to strike the balance between doing what you do on a daily basis and trying to squeeze something else in," he says.

As head of the department, Humphrey has to sign off on all faculty members' consultancy jobs. He cautions that researchers must maintain clear boundaries by, for example, not mingling consultancy work with university travel unless it is explicitly approved. He also notes that in some countries, including the United States, taxes are usually not taken out of payment up front, so consultants must plan accordingly and set taxes aside — or risk penalties. All scientists who act as consultants, whether full or part time, must grapple with the sometimes-elusive concept of doing unbiased science for a paying client who has a vested interest in the outcome. "You should question yourself on every job," says Şekercioğlu. "When you're working for industry and big government, it's hard to resist that pressure sometimes." Working for free helps Şekercioğlu to stick to his principles, he says. "I can stand my ground. But consulting is often not black and white. It's grey."

"When people are doing consulting, it's not something we talk openly about. Many academics believe in the purity of academic pursuit."

"Maintaining scientific neutrality can sometimes require significant professional discipline," says Olson. "I always strive to do good science, but science is not a cut-and-dried field of work. Results can be interpreted in different ways." One of Olson's clients, a consortium of chemical companies, paid him to evaluate some scientific papers and investigate whether the methodology in them was sound; he found egregious flaws. Olson says that being paid didn't influence the quality of his work, but it was always in the back of his mind. "I know who's paying me and I know what they want to see," he says. Consultants should make sure clients understand that they intend to report the scientific results, whatever they may be, says Olson. "And if the client is legitimate, they'll not only accept robust science, but they'll be enthusiastic about it," he adds. "I wouldn't work for someone otherwise."

Even with all the caveats, scientists who act as consultants often find it fulfilling. The anonymous oceanographer says that one of his consultancy projects paid him to do a literature review that was highly valuable for his own research. "For me, it's kind of a dream thing," he says. Dabbling in diverse areas is part of the reward. "They're quick little projects," says Olson, "where I get to learn about some new area of science." ■

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TURNING POINT
Giovanna Tinetti

Giovanna Tinetti, a planetary scientist at University College London, learned in February that her team's proposal to lead the £400-million (US$642-million) Exoplanet Characterisation Observatory (EChO) mission to search for life on other planets will be backed by the European Space Agency (ESA).

You started off as a theoretical particle physicist. How did you make the leap to searching for life on exoplanets?
I was pursuing my PhD in theoretical physics at the University of Turin in Italy, yet I was increasingly interested in working on something for which experiments were the driving force. So I started to look at other possibilities. In 1998, NASA started a virtual Astrobiology Institute to prepare ambitious experiments looking for life and habitable planets in the Universe. As I learned more, I decided that it was a great move for me. I was intrigued by ideas about Gaia and the notion that abiotic planets and living organisms grow together. I began my adventure with exoplanets as a postdoc at NASA's Jet Propulsion Laboratory in Pasadena, California.

Characterize your early career choices.
I made a series of decisions not to follow the 'safe' route. First, I turned down a well-paying job, instead choosing to finish my PhD. And just deciding to begin this search for exoplanets meant making a big bet with my career. Back then, only a few extrasolar planets had been discovered, and nobody knew whether they would prove viable for life. Several people told me that this could be a path that leads nowhere. I just felt that I had one life, and if I didn't try, I would regret it. Luckily, the field has been successful, so I made the right choices.

How have your past experiences shaped how you approached this space mission?
During my postdoc, a number of extrasolar planets were discovered, and attention shifted to a dedicated experiment to probe exoplanet atmospheres. It ultimately became a joint project, combining NASA's Terrestrial Planet Finder (TPF) and ESA's Darwin. But technological challenges and budget hurdles kept pushing the launch date further and further back. At the same time, we discovered that we could look for atmospheres that signalled potentially habitable worlds by monitoring planets as they move in front of their stars. This 'transit spectroscopy' technique proved successful, and we started to think that, rather than pursuing a big experiment, we should use the technique with existing telescopes, such as Hubble or Spitzer. So the TPF/Darwin mission was shelved. But the process of preparing for a big experiment was informative.

Did that help you achieve success with EChO?
Absolutely. Using the transit technique and existing technology, we can now make the most of a dedicated exoplanet mission. The most important technology — including a 1.2-metre telescope and spectrograph — already exists. That was important when submitting a proposal for a launch in 2020.

Are you confident EChO will launch in 2020?
I plan to work hard to ensure its success. It looks like a long lead time but it's really not. We have to go through ESA's assessment phase, to judge whether the project is doable — so we have to be ready to answer any question relating to the science.

Are you taking steps to safeguard your career in case EChO is derailed?
The preparation for EChO relates to my everyday research. My team continues to work hard on observing planets from the ground and from the Hubble and Spitzer telescopes. When you are involved in a space mission, you can't bet on its success until you see the satellite in orbit. That said, we are doing our best to create a mission that benefits extrasolar-planet research.

What is the most important thing you've done for your career?
I can say that it was a good idea to spend one year of my life pursuing this space mission because, in the end, we were selected. You have to believe in something — unfortunately, that doesn't necessarily mean it will happen. ■

INTERVIEW BY VIRGINIA GEWIN