

# The Impact of the COVID-19 Pandemic on the Future of Science Careers

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Cite This: <https://dx.doi.org/10.1021/acs.chemrestox.0c00436>



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**ABSTRACT:** As COVID-19 swept across the world, it created a global pandemic and an unpredictable and challenging job market. This article discusses the future of the 2020–2021 job market in both academia and industry in the midst and aftermath of this pandemic.

The American Chemical Society (ACS) Division of Chemical Toxicology (TOXI) held a career panel at the virtual ACS conference that discussed the impact of the COVID-19 pandemic on the academic and industrial job markets in 2020–2021. The panel included experienced scientists from both academia and industry: Dr. F. Peter Guengerich (Tadashi Inagami Chair in Biochemistry, Vanderbilt School of Medicine), Dr. Nicholas Meanwell (Vice President, Bristol-Myers Squibb), Dr. Melissa Schutten (Principal Scientist-Pathologist, Genentech), and Dr. Maureen McKeage (Assistant Professor, McGill University). The panel was hosted by Dr. Michael Trakselis (Professor and Director of Graduate Affairs, Baylor University), the Vice Chair of ACS TOXI 2020.

**Hiring Freezes: The New Normal in Academia.** The economic plunge induced by the COVID-19 pandemic has created a career calamity in academia, resulting in a funding crisis. Most universities across the US and Canada have announced hiring freezes for new faculty lines, which will make securing an academic position and research funding extremely challenging in the coming year. However, as mentioned by Dr. Guengerich, there are always targeted opportunities at both the junior and senior levels for outstanding candidates. Most of these opportunities arise from informal discussions, social networking, and exposure at conferences. Thus, establishing and maintaining a broad network of scientists is deemed important, especially during this pandemic. As highlighted by Drs. Guengerich and McKeage, the silver lining in this challenging job market is that there seems to be no apparent reduction in the number of postdoc positions advertised on social media platforms. The panelists strongly recommended becoming active on Twitter, as it has become a prominent platform in advertising job postings in academia. However, Dr. Guengerich expressed concern that the academic job outlook for the 2020–2021 year will be more challenging than that brought on by the 2008 financial crisis because universities are challenged on all fronts with decreasing student enrollments, online classes, and decreased research output.

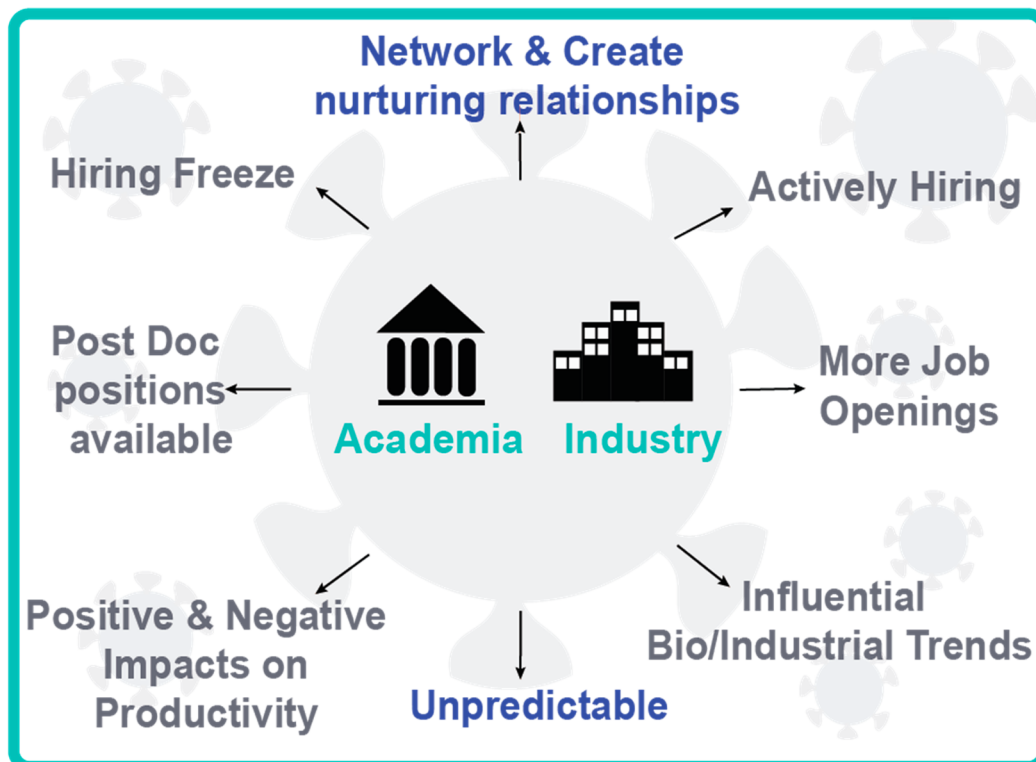
The pathway to obtaining funding for academic research has always been challenging, noted Dr. Guengerich. Federal funding for research appears to be unaffected by the pandemic and continues at a stable level. However, the panel went on to mention that funding provided by philanthropic charities will take a hit. Financial contributions and social fundraising events have been significantly limited by the pandemic, leading to decreased support from several agencies.

**No Signs of Alarm in the Biopharmaceutical Industry.** Compared to academia, the industrial and biopharmaceutical job markets appear promising in terms of the availability of open positions and hiring. While it is somewhat challenging to predict the future job market, currently there are no apparent hiring freezes in industry. With increasing demand for COVID-19 testing kits, Genentech (owned by Roche diagnostics) has been busy designing and validating COVID-19 tests. This has expanded job opportunities within many companies, Genentech included, who are actively hiring, says Dr. Schutten.

One fortuitous outcome from the recent COVID-19 pandemic is that more collaborative opportunities between biopharma and industrial companies in discovering, validating, and producing a new vaccine are beginning to emerge. As these attempts become promising, industries will come together to manufacture the vaccine to make it broadly available. This will amplify the job opportunities in several different fields such as toxicology, chemistry, and commercial manufacturing.

**Exciting Trends Transforming the Future of Biopharma.** Apart from the new avenues that have been created due to COVID-19, the panelists also shared their insights on other influential biopharma and industrial trends to be on the lookout for in the next 5 years. According to both Drs.

# Impact of COVID-19: A Challenging JOB market is on the rise



**F. Peter (Fred) Guengerich**  
 Tadashi Inagami Chair  
 in Biochemistry  
 Vanderbilt School of Medicine



**Maureen McKeague**  
 Assistant Professor  
 Pharmacology & Chemistry  
 McGill University



**Nicholas Meanwell**  
 Vice President  
 Bristol-Myers  
 Squibb

Meanwell and Schutten, the concept of ligand-induced degradation is an exciting, emerging frontier in medicinal chemistry. Proteolysis TArgeting Chimera (PROTAC) is a major focus for several companies as a means of ligand-induced degradation and promises to make an impact in the near future. PROTAC is a proteasomal targeting system where a ternary complex, consisting of two ligands connected by a linker, can artificially signal proteins for degradation. One ligand binds to a target protein and the other binds to a ubiquitin ligase. PROTAC ubiquitinylates the target protein and signals it for degradation by the proteasome.<sup>1,2</sup> This new frontier in chemistry has the potential to tackle numerous biological targets that are considered undruggable and allows for the targeted control of protein levels.

**Establishing Your Career Path.** The panelists were asked how a new Ph.D./Postdoc should envision their career path in industry for the first 5–10 years. Specifically, are positions relatively stable, or do most people jump between biotech startup companies early in their career? The panelists shared that the career paths in industry are generally quite stable. The San Francisco Bay area, the industrial hotspot, is filled with startups and some bigger companies with larger biotech portfolios. In these large organizations, there are a diverse group of people where anyone can gain good mentorship, training, and valuable experience. However, there is also a tendency to transition from startup to startup, not because of job instability, but because of the exciting new opportunities

that will allow people to maximize their contributions to science and learn new techniques and applications.

Networking plays a pivotal role to effectively get applicants' foot in the door in both academic and industrial sectors, says Dr. McKeague. The recognition gained through networking moves applications to the top of the pile for a second look and become a standout among all the applicants. Although there is a role for recruiters in finding people for more senior professions, new Ph.D.s are regularly hired directly through schools, web sites, and especially through networking, says Dr. Meanwell. Dr. McKeague also advised that "cold" calls or emails to faculty at other institutions was one of the most helpful things she did to land a faculty position. Additionally, she suggested that this "cold" call approach was also productive in obtaining career advice, as most people are helpful in sharing their experience in their career search or opportunities that may be available soon. Dr. Guengerich suggested that early career researchers must have a strong, independent, and collaborative work ethic.

Dr. Guengerich and Dr. McKeague emphasized that welcoming advice, creating nurturing, legitimate relationships with more senior professionals, being inquisitive, and plunging forward are key ingredients to effectively embark on an academic career. People who are well trained and with interesting and fundable problems can adapt in different environments by taking advantage of available resources. Dr. Guengerich compared starting an academic laboratory to building a small business, where people are evaluated on how well they do in a specific area but have to run all aspects of the lab including teaching, fundraising, budgeting, personal, and project management. In contrast, in industry, people often work in big teams with everything in place and vast resources to fulfill specific tasks. Nevertheless, it is important to look for synergistic opportunities at your new institution/position and apply your expertise to exciting interdisciplinary problems.

**Productivity in the Era of COVID-19.** With the majority of the country being shut-down at some point during the pandemic, much of the scientific community was forced to transition to primarily virtual or remote work. The panelists were asked if this transition to virtual work had an impact on their productivity. Dr. Guengerich noticed a significant negative impact on productivity in both teaching and research during the transition to more virtual work. Many laboratories had to temporarily close their doors, which severely limits lab personnel, students, and postdocs from acquiring experimental data for publications. Alternatively, Dr. Meanwell mentioned that the transition to virtual work has had both positive and negative impacts on his productivity, depending on the type of work. All panelists envision that this remote working experience will have a lasting effect and may change how we all do science in the future.

**Take Home Message.** The panelists concluded the session by sharing profound advice with the next generation of scientists: The ultimate goal of Ph.D. training is not merely about learning to perform specific scientific experiments, but instead to learn to direct a project and become a problem solver. Chemists are especially versatile, entrepreneurial, and well-equipped. Thus, it is important to identify what you are passionate about and look for career opportunities accordingly. Then, use your social and professional network to help you achieve your goals especially when a pandemic is impacting all parts of our working lives.

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### Notes

The authors declare no competing financial interest.

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