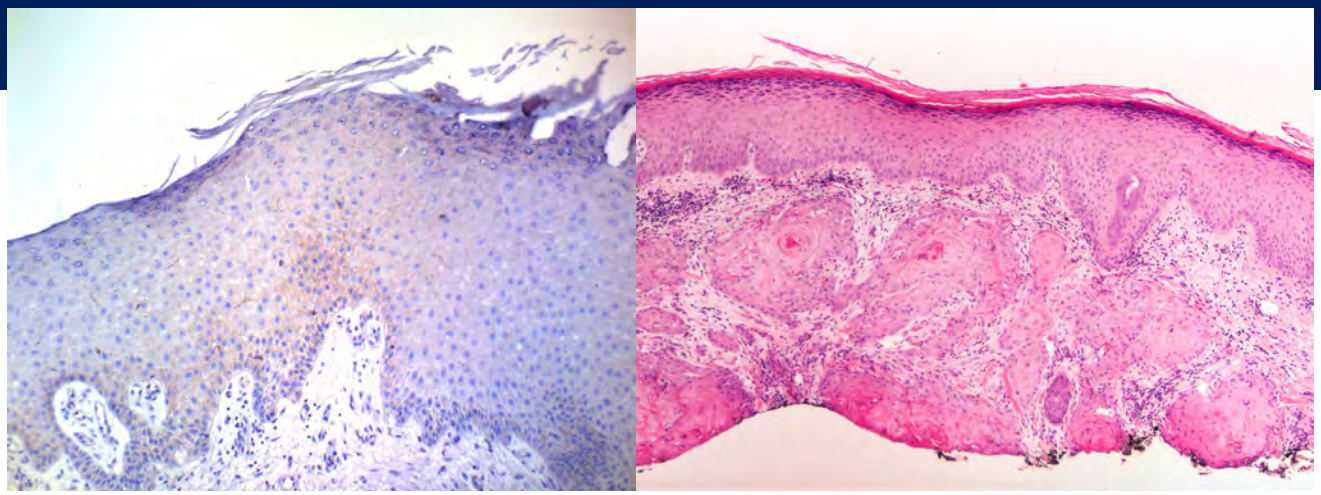
GOING FOR GOLD:

P30 GRANT RENEWED WITH PERFECT SCORE FROM NIH



" The excellence of the SBDRC is the combination of the Department of Dermatology with so many other departments around the university." - Elizabeth Grice, PhD

In 2016 under the leadership of **Sarah Millar, PhD,** and **George Cotsarelis, MD,** the Department introduced the Skin Biology and Diseases Resource-based Center (SBDRC). The success and continuation of the Center is made possible by the support of a five-year P30 Center Core Grant from the National Institutes of Health (NIH) and the National Institute of Arthritis Musculoskeletal and Skin Disease (NIAMS). These awards are specifically allocated to fund programs with shared resources to be used by multiple independently funded investigators across disciplines, with the goal of increasing research efficiency and translational power.

The Department of Dermatology at the University of Pennsylvania Health System spans across eight distinct clinical locations, with over 120,000 outpatient and 103,000 biopsy reports per year. With a large patient volume and vast network of Penn researchers, the Department of Dermatology at Penn was, and continues to be, optimally positioned to advance discovery in the causes, treatment, and prevention of skin disease. Since the SBDRC's founding, membership continues to grow and an impressive list of more than 185 peer-reviewed articles associated with the SBDRC have now been published.

Since 2019 **Elizabeth Grice, PhD** has served as Associate Director of the SBDRC, and she will now serve as the Director of the renewed SBDRC. She has proven to be instrumental in overseeing the management of the SBDRC and the P30 grant. The SBDRC is one of only seven NIAMS funded P30 Resource Centers in the country. The Center is composed of three resource cores, two administrative committees, and four enrichment program sub-cores (please see *Figure 2*). In an effort to further the impact of the funding, the Department matches seed money originating from the P30 award. During the last funding period, an investment of $300K in supportive funding resulted in securing over three million dollars in grants, an astonishing 1:10 return. This further highlights the strength of our Department's investigators and demonstrates the impact that a P30 grant can bring to our institution.

Core A: Cutaneous Phenomics and Transcriptomics (CPAT)

Led by **John Seykora, MD, PhD**, and **Brian Capell, MD, PhD**

Core A is the most heavily utilized of the resource cores. Specifically, it provides innovative, state-of-the-art services to characterize the histopathologic and molecular features of skin samples from human patients and genetically engineered mice. Next Generation Sequencing technologies for genomic and transcriptomic analysis and advanced in-vivo imaging systems are some of the resources facilitated through this Core. With the renewal, the Core will expand to provide biophysical analysis of skin barriers (TEWL, pH, corneometry), two-photon microscopy and macrofluoresence intravital imaging, and libraries of scRNA-seq.

Core B: Skin Translational Research Core (STaR)

Led by **Aimee Payne, MD, PhD**, and **Todd Ridky, MD, PhD**

Core B provides IRB approval assistance for the procurement of primary skin cell cultures. This Core provides state-of-the-art methods for genetic manipulation of these cells, including, but not limited to, CRISPR/Cas9-based genome editing, high-throughput screening and skin xenografts. Dr. Payne also directly consults with each investigator prior to research execution to ensure appropriate samples are being selected for the project at hand. These include innovative services that are unique and enable ground-breaking research approaches. This core assisted in 65% of all studies supported by the SBDRC.

Core C: Data Science and Informatics Core (DSI)

Led by **David Margolis, MD, PhD**, **Joel Gelfand, MD, MSCE**, and **Elizabeth Grice, PhD**

Core C serves to solidify high-standard rigor, reproducibility, and efficacy of both bench and translational research studies. It assists in study design, biostatistical analysis and computational dermatology services. This includes services such as ChIP-seq, LCM sequencing, and 16s RNA analysis. Expansion under the new P30 grant term include enhanced medical record data sets from UPHS and beyond and artificial intelligence-guided approaches to quantifying patterns in dermal samples.

Figure 1. SBDRC Overall Resource Cores

While in the midst of the global pandemic, Dr. Grice led the effort to develop a plan for the submission of a stellar grant renewal application. When asked about how one approaches such a proposal, in true Penn spirit, she recalls, “I joked with people that I wouldn’t be happy with anything less than a ‘perfect 10’ on this renewal. Well, I wasn’t really joking, I would say that if we don’t get a perfect score then I’m not sure if this is going to get funded. I knew how important this was for the Department.” The P30 support of the SBDRC is essential in advancing scientific discovery not only for Penn, but for the greater public whom we serve.

Central to our mission, our future knowledge in skin biology and clinical dermatology is only as strong as the training that our junior scientists receive. As such, the SBDRC prioritizes training and mentoring the next generation of physician-scientists. As a testament to the success and strength of this model, it is is not surprising to discover that Dr. Grice was initially mentored by Dr. Sarah Millar. From 2016-2019, Dr. Millar, now a Department Professor Emeritus, served as Director of the SBDRC, and upon her transition from Penn, Dr. Grice assumed the role of Associate Director. Dr. Grice noted, “[Dr. Millar] continued to serve in an advisory role to the SBDRC until recently, actually. It was very useful to come in as a junior faculty and train for this type of role, rather than just jumping right into this overnight."

When the NIH released their evaluation, the Penn SBDRC earned top marks with a renewal score of a perfect 10. In the spirit of a primary objective of the P30 Grant, Dr. Grice affirms that it was “ truly a

team effort [that] comes through on the application." Given the uncertainties presented over the past year, access to conducting research has been limited. Many researchers have been significantly busier while having less time overall to dedicate to in-person research. Despite these obstacles, the collaborative effort was vital in securing the renewal and was highly lauded in the NIH's report, citing adaptability and diversity of membership as fundamental strengths of the SBDRC.

P30 funding produces collaborative research that enables innovative approaches to the most pressing health concerns. The SBDRC boasts 74 investigators of all ranks, representing Penn's School of Dental Medicine and School of Veterinary Medicine, 11 departments within the Perelman School of Medicine, and 13 academic institutions outside of Penn. In addition to a yearly day-long symposium, the SBDRC also hosts the Duhring Lecture and weekly Dermatology Research Seminars. These events bring together scientific and clinical excellence in multiple disciplines

to solve complex medical problems. As the SBDRC moves into its second iteration, Dr. Grice notes that a goal over the next five years is to "keep expanding our national reach."

In addition to continuing to build new partnerships, the SBDRC will introduce a new internal funding mechanism, called a "Summary Statement Award." This program, which will be made available to members later this year, will function to support investigators who have applied for NIH funding, but may require additional data before their proposal can be approved. Dr. Grice illustrates, "This gives us some funds to support these researchers and to do those experiments until they can then resubmit." It is anticipated that the SBDRC will support three resubmissions per annum. Given the SBDRC's proven success in attracting external funding for projects after providing resources for preliminary data generation, this will provide yet another path for our junior level researchers to participate in innovative scientific inquiry. This data can be used as the basis to apply to more NIH funding opportunities

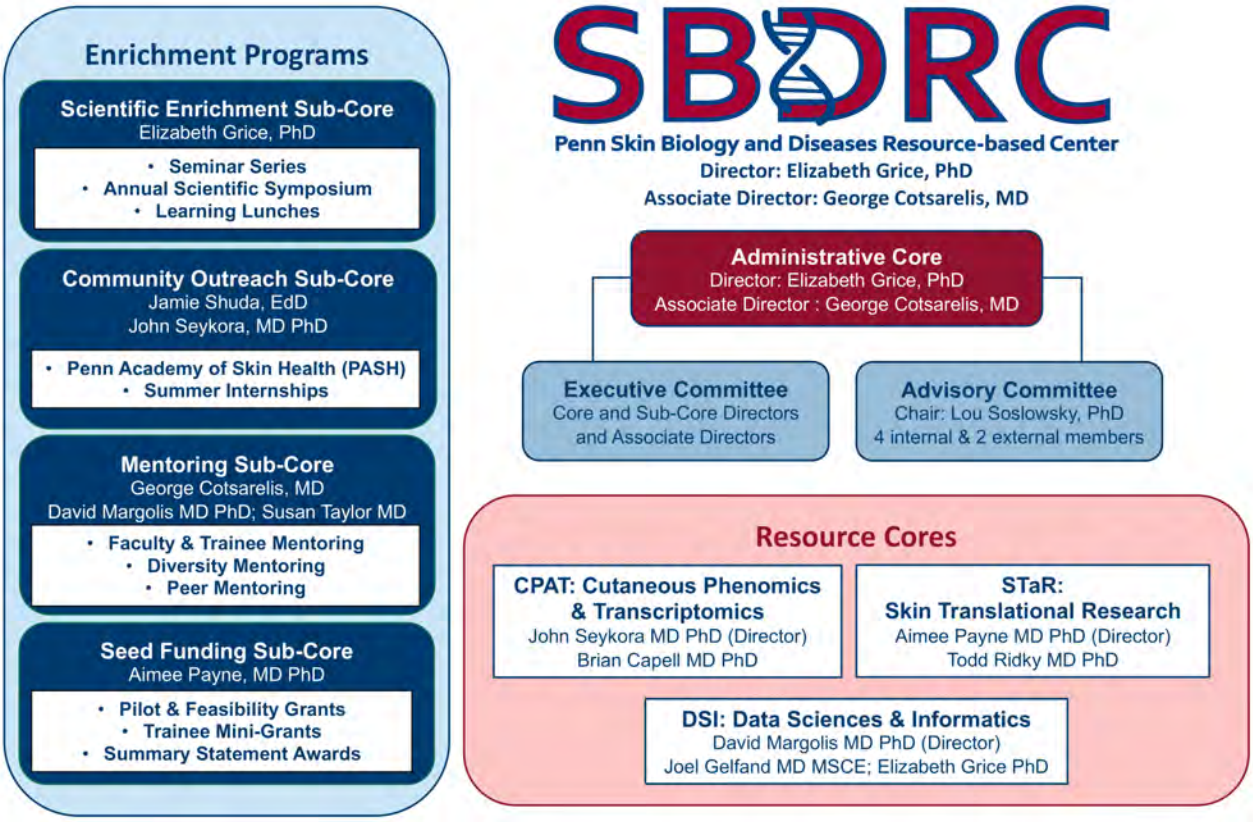


Figure 2. Overall SBDRC Leadership Structure

in the future and jumpstart a researcher's career in academic medicine.

In fact, the SBDRC's robust Mentoring Sub-Core serves as a resource to facilitate meaningful partnerships between investigators of all levels. Dr. Grice credits the Department's active approach to mentoring as a contributing factor in her role as a leader of one of only a handful of prestigious research centers of this kind in the United States: "I never saw myself winding up here in this position. When I started grad school, I could honestly have never seen myself as a PI. There were not a lot of female role models and it became apparent the system was not designed for women to succeed. And I thought, "I don't want to do that to myself." Connecting investigators to mentors, especially mentors that they recognize themselves in, has been empirically proven to contribute to diversification in the medical field.

The SBDRC is a multi-layered and diverse program that goes well beyond serving as a resource to academic researchers. Planned expansion in the Community Outreach Sub-Core, led by **Jamie Shuda, EdD,** and **John Seykora, MD, PhD,** aims to increase accessibility of opportunities for local, under-resourced communities by providing educational and research programs for high school students. The most recognizable aspect of this sub-core is the Penn Academy of Skin Health (PASH), which invites local high school students to participate in spring and summer programs. The students receive training in laboratory techniques from department researchers and attend lectures pertinent to pursuing a career in science.

Students examining cell cultures under supervision of instructors in PASH. *Photo taken pre-pandemic.*

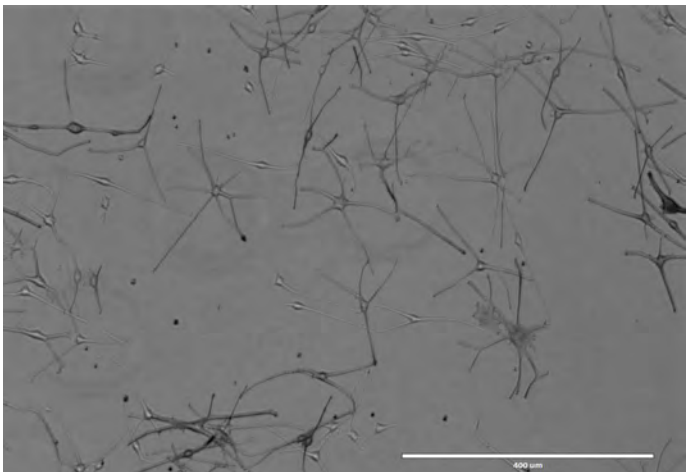
Dr. Grice supporting Victoria Lovins, PhD student in the Microbiology, Virology, Parasitology program, during an experiment.

Dr. Grice explains, "A big part of the SBDRC renewal is enhancing the PASH offerings. Jamie Shuda has been greatly involved in that, in increasing our offerings for the spring Saturday sessions and in getting funded summer internships for the students. Dr. Susan Taylor is now on the steering committee for PASH and will help influence the student curriculum and find the best candidates from the public Philadelphia high schools." By gaining first-hand scientific research experience with current dermatologic investigators, these students are poised to generate a network of mentorship that may not have otherwise been available to them. Through this program they are mentored and trained by our own faculty and graduate students and learn to recognize the value of collaborative inquiry.

We are very fortunate to have **Susan Taylor, MD,** serve as the Vice Chair of Diversity, Equity, and Inclusion for the Department of Dermatology. Dr. Taylor brings her expertise into the planning of the PASH to further highlight the active work we, as a Department and member of the Penn community, are undergoing to ensure equity and justice are integrated within all of our programs. Continuing to expand on not only the Department's, but also the SBDRC's, focus on community engagement solidifies the significance of the program and its success when it reaches beyond the walls of academia. As witnessed countlessly within Penn Dermatology, a mentor can make all of the difference in the trajectory of a young investigator.

The University of Pennsylvania's Skin Biology and Diseases Resource-based Center is empowering investigators to utilize cutting-edge technology and form meaningful partnerships with researchers outside of dermatology. The last five years have illustrated the robust knowledge that can be generated from cross-disciplinary investigation and highlight the way in which streamlining resources can be administered to benefit dozens of researchers.

Dr. Grice examining the cell cultures developed in her lab.



Melanocytes, mature melanin-forming cells, under the microscope. *Photo courtesy of Dr. Aimee Payne.*

We wish success to Dr. Grice, who will formally assume the Director of the Center on July 1st, with the commencement of the renewed funding period. We thank all members who have contributed to the success of the SBDRC and are enthralled to watch it expand over the next five years.

$4,062,500	Total Grant Award
$ 812,500	Grant Award in YR1

120,000	Outpatients per year
103,000	Biopsy reports per year