Creating opportunities

Dr Melissa Harrington, Professor of Biology at Delaware State University, USA, speaks about her passion for neuroscience and helping women researchers achieve their potential

Could you introduce the Delaware Center for Neuroscience Research and describe the circumstances that led to its creation?

About six years ago, I began meeting regularly with a group of neuroscientists from Delaware State University, the University of Delaware and the Nemours/Alfred I duPont Hospital for Children. We joined forces to create a vision for a virtual centre that would bring together neuroscientists from across the state to share resources, foster collaboration in both research and education, and establish a strong mentoring system for young investigators. We called ourselves the Delaware Neuroscience Consortium and began to jointly sponsor retreats, seminars and symposia. In addition, we revived Delaware's chapter of the Society for Neuroscience, which had been dormant for a decade, and began seeking funds to support our centre and expand neuroscience research in Delaware. When it came to applying for funding in 2008-09, our timing was unfortunate, so it took longer than any of us expected. However, in 2012 we were finally successful in being awarded a five-year $10.5 million grant from the Centers of Biomedical Research Excellence (COBRE) programme at the National Institutes of Health (NIH).

Why did you feel it was important to establish a Center for Neuroscience in Delaware?

Delaware is a small state – the second smallest in terms of area and the sixth smallest in terms of population – and because of its size, it does not have its own medical school. This means there is no organising centre, which has reduced investment in biomedical research and slowed its growth. Consequently, neuroscientists in Delaware are scattered across multiple departments and institutions – no singular institution has the critical mass to support a competitive neuroscience research and education programme.

Women remain underrepresented in faculty positions, especially at the top level. In your experience, what are the predominant causes of this?

There are many causes for this. However, among my peers, the most common issue that I see slowing the advancement of women is the need to place their husband's career first. In academic science, the reality is that for one member of a couple to get their dream job and devote themselves to their career, the other has to compromise. Almost always, it seems it is the woman who makes the sacrifice.

These dynamics are difficult to change, but there are other factors that are more easily addressed. Even today, our culture socialises women to be helpful and easy to get along with, to be team players and to think of others first. So in trying to live up to the expectations that society has for us, women in faculty positions tend to be weak negotiators. Most don't talk enough about their accomplishments because they don't want to seem like they're bragging. Women can also be reluctant to ask for help or advice from mentors and colleagues, either because they don't want to bother people or they don't want to seem incapable. The mentoring component for our Center is designed to address these factors that hold women back.

Has being mentored had a positive impact on your career?

Absolutely! At every stage of my career, I have always had a mentor – usually several – who helped me be successful and progress to the next phase. With only a couple of exceptions, all of my mentors have been men. This has been really important, because they helped me see how men achieve success and how successful men behave. I learnt to code switch, to some extent, in order to interact professionally with men in a way they were comfortable with. With academic and scientific leadership still predominantly male, gender code switching is a skill that women scientists and academics must learn in order to be successful.

Since its launch in 2012, the Center has grown from strength to strength. Could you provide a preview of what the future may hold?

Our Center supports more investigators than most other COBRE organisations, and our goal is to ensure they all have their own independent funding before the end of the five-year grant. When we go for renewal I want us to be requesting funds to support an entirely new group of young investigators. With the progress our current investigators are making to obtain funding, that seems like an achievable goal.

Dr Melissa Harrington with co-Director Professor Jeffrey B Rosen.

Empowering young **investigators**

As a diverse driver of innovation and success, the **Delaware Center for Neuroscience Research**, USA, is helping to advance the careers of promising neuroscientists

WOMEN IN THE 21st Century have more career opportunities open to them than ever before. In the US, for example, over the last generation, women have received almost half of all doctoral degrees awarded in life science; yet in spite of this, they remain significantly underrepresented in faculty positions, especially at senior levels. A study conducted in 2005 found that in the top 50 biology departments of the US, only 30 per cent of assistant professors and less than 15 per cent of full professors were female.

Dr Melissa Harrington, Professor of Biology at Delaware State University (DSU), believes a supportive environment and robust mentoring programme can help address some of the varied and complex causes of this troubling gender disparity in high-level scientific research. In 2012, after many years of collaborating with other researchers to advance local neuroscience, she launched the Delaware Center for Neuroscience Research.

AN INNOVATIVE INITIATIVE

This virtual, interdisciplinary institution is funded by a grant from the Centers for Biomedical Research Excellence (COBRE) programme of the National Institute of General Medical Sciences. It aims to develop infrastructure that supports the research and career development of multidisciplinary neuroscientists, with a specific focus on assisting women. Under the direction of both Harrington and Dr Jeffrey B Rosen of the University of Delaware (UD), the Center is currently supporting 13 young investigators. They provide significant funds, release them from teaching and administrative responsibilities, enable opportunities for professional development, and facilitate regular interaction with established mentors in their respective fields.

COMPLEMENTARY COLLABORATION

The Neuroscience Center unites faculty, students and research resources from two very different institutions: DSU is a minority-serving, mainly undergraduate university and UD is a research-intensive, flagship institution. The resulting array of perspectives and experience creates exciting opportunities for synergies and collaboration: "One of the great aspects of our Center is that each institution brings different strengths," Harrington explains. "The priority at UD is behavioural neuroscience while at DSU our focus is on molecular and cellular research. These different emphases mean that we complement rather than compete, making it easy for everyone to work together."

Indeed, the current research projects being conducted by the affiliated faculty members span multiple areas of analysis, testifying to the strength of the Center's interdisciplinary nature. For example, in the area of behavioural neuroscience, two faculty members are conducting research into foetal alcohol syndrome, while three others are investigating neurodegenerative disorders, working under the umbrella of molecular and cellular neuroscience. Other faculty members are using invertebrate and lower vertebrate models to study basic neurobiology and early neural development, and there is also one cognitive scientist researching visible non-verbal cues for verb learning.

> The virtual, interdisciplinary Center aims to develop infrastructure that supports the research and career development of multidisciplinary neuroscientists in Delaware, with a specific focus on assisting women scientists

The Center benefits from having both an Internal and External Advisory Committee, which aid the balance of potential agenda disparities between the different departments and institutions represented. While the External Advisory Committee is focused on the progress of the investigators, the internal one helps Harrington and Rosen manage the Center: "Our Internal Advisory Committee has been a fantastic source of advice and assistance to us," Harrington emphasises. "It provides a kind of institutional perspective that helps us make good decisions, and the members have given very generously of their time to help us with reviewing applications for pilot projects, preparing for our External Advisory Committee meetings and other events."

RESEARCH FOCUS

Dr Melissa Harrington's research focuses on the functional development of motor neurons and how this goes awry in motor neuron disease. Motor neurons have two types of synapses (cell junction); one at the neuromuscular junction that controls muscle contraction in the periphery of the body; and another in the spinal cord that modulates reflex movements and coordinates muscle activation. The neurons signal with different types of neurotransmitters at the alternative junction types. Harrington makes use of electrophysiological techniques, capable of recording electrical impulses from individual neurons in mouse embryos and neonatal mouse pups, to investigate how development is regulated and how loss of the survival motor neuron 1 (SMN1) protein – causing loss of active synapses – leads to spinal muscular atrophy, the most common inherited cause of infant mortality.

STRONG SUPPORT

A major initiative of the Neuroscience Center is its structured mentoring programme that aims to assist the young investigators, particularly women, to progress to senior levels in their careers. Previous studies have demonstrated that strong mentoring systems are critical for the successful career development of junior faculty members. In view of this, each affiliated investigator is assigned two mentors who are responsible for advising on a variety of issues, including grant proposals and publications, in an effort to make them more competitive.

The supportive environment created by this strong mentoring programme is particularly beneficial for women researchers, who can face additional challenges when undertaking research. For instance, research has shown that women are asked more frequently than men to provide campus services on committees, placing competing demands on their time and attention. Sound advice from senior faculty members on time management can help redress these issues, showing women how they can best invest their time for more efficient career progression. With regular formal meetings and reports – and the fact that mentors are financially compensated for their time – the Center's structured mentoring system helps to remove these barriers.

In addition to its mentoring programme, the Neuroscience Center also provides professional development opportunities to its affiliated investigators through a varied programme of annual retreats, monthly meetings, symposia and workshops. There is a very strong emphasis on peer support among the investigators and the various meetings provide a safe place for them to evaluate their ideas, papers and grant proposal drafts.

DRIVING DIVERSITY

The Center also aims to bolster the research infrastructure at DSU by improving the training on offer to current faculty members; building a stronger body of neuroscience researchers through additional recruitment; purchasing new equipment; and renovating important animal facilities.

As a historically black colleges and universities (HBCU) institution, diversity continues to be one of DSU's positive attributes, with approximately 75 per cent of undergraduate and 50 per cent of graduate students belonging to an ethnic minority group. The demographics of the student body will help DSU launch the biomedical research careers of many highly-trained minority graduates. This is especially important given predictions that immigration and high minority birth rates will lead to minorities constituting a majority in the US by 2050. Failure to address the current low minority representation in biosciences will risk slowing the pace of scientific innovation, negatively impacting US global competitiveness.

MAKING PROGRESS

Today, with the growing complexity of biomedical research and its dependence on advanced instrumentation and techniques, it is growing increasingly difficult for lone investigators to compete for funding. A thematic, interdisciplinary institution like the Delaware Center for Neuroscience Research is therefore hugely valuable, both in its ability to pool resources as well as facilitate collaboration between small institutions and new investigators.

Ultimately, the Center's major objective is to allow each of the young investigators to develop into mature, independent scientists, in turn feeding into the advancement of a strong neuroscience community in Delaware. Even after only two years, the Center's success is starting to become apparent. Three faculty members have already received independent funding and Harrington is confident the others will soon follow suit, forging the way for more women to achieve senior faculty positions and success in their chosen career paths.

INTELLIGENCE

THE DELAWARE CENTER FOR NEUROSCIENCE RESEARCH

OBJECTIVES

- To develop an interdisciplinary, inter-institutional virtual centre that will build a scientific community focused on investigating neural development and plasticity
- To establish an integrated mentoring and professional development programme that will help junior faculty become independent, externally-funded researchers
- To improve the research infrastructure and capacity of a historically black colleges and universities (HBCU) institution with an emerging strength in neuroscience research and education

KEY COLLABORATOR

Professor Jeffrey B Rosen, co-Director of the Delaware Center for Neuroscience Research, University of Delaware, USA

INTERNAL ADVISORY COMMITTEE

Dr Deni Galileo; **Professor Mark Stanton**, University of Delaware, USA

Dr Leonard G Davis, Delaware State University, USA

FUNDING

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DR MELISSA HARRINGTON is Professor of Biology at Delaware State University. She gained her PhD in Neuroscience from Stanford University, California, where she also undertook postdoctoral training before starting her faculty career as Assistant Professor at Morehouse College. Harrington moved to Delaware State University as an Assistant Professor in 2001. In addition to her research and position as Director of the Delaware Center for Neuroscience Research, Harrington participates in teaching, outreach activities and the supervision of graduate and postgraduate students.

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