

Mapping the neural circuits of bipolar disorder before symptoms strike

Bipolar disorder: Reading the neural circuit before the clinical storm arrives

PITTSBURGH, PA, UNITED STATES, March 17, 2026 /EINPresswire.com/ -- Research led by Dr. Mary L. Phillips at the University of Pittsburgh is tracking the development of large-scale neural networks from infancy through young adulthood, mapping the emergence of emotional reactivity patterns that may predispose individuals to bipolar disorder years before clinical symptoms appear. The work, described in a new [Genomic Press](#) Interview published in [Brain Medicine](#), aims to identify abnormalities in prefrontal-striatal-limbic circuitry (the brain networks connecting regions responsible for decision-making, reward, and emotion) that can serve as biomarkers for the disorder and guide the development of targeted, early interventions.

The importance of this line of research has been recognized both at the University of Pittsburgh and nationally. Dr. Phillips holds the Pittsburgh Foundation-Emmerling Endowed Chair

in Psychotic Disorders and is Distinguished Professor of Psychiatry, Bioengineering, and Clinical and Translational Science. She was elected to the National Academy of Medicine in 2024 and awarded the Society of Biological Psychiatry Gold Medal that same year. The author of more than 400 peer-reviewed publications, she now directs three research centers at Pittsburgh:



Mary L. Phillips, MD, MD (Cantab), University of Pittsburgh, USA.



Dr. Mary Phillips and her research team.

CNCTI-P for interventional psychiatry, CENTRIM-BD for metabolic psychiatry, and CRTDAN for translational and developmental neuroscience. Three centers, one vision, built over decades around a single, enormously difficult question: Can we read the neural circuitry of bipolar disorder before the disorder reads the patient?

Recently, her lab has begun working with biotech companies to examine the neurobiological mechanisms underlying novel neuromodulation and metabolic interventions, attempting to optimize these treatments at the individual level. The clinical frustration behind this work is not abstract. It is the memory of patients for whom existing treatments were not enough, and it is only now, she believes, that the technology is available to meet this ambitious goal.

The conviction that the brain holds the key to understanding psychiatric illness took root early. In Nottingham, England, in a state comprehensive school where egalitarianism was practiced fervently and with suspicion toward anyone who broke ranks, the teenage Mary Phillips stood up in biology class and said something that got her into trouble. She said the brain was superior to every other organ in the body. Her argument was precise: you could transplant a heart, a kidney, a liver. You could not transplant the brain. The teachers disapproved. Her classmates shifted in their seats. She was not wrong. She has spent

“ I have spent many years as a psychiatrist being frustrated at the lack of treatment options for patients with terribly debilitating psychiatric illnesses.”

*Dr. Mary L. Phillips,
Distinguished Professor,
University of Pittsburgh*

neural network in Aplysia and how understanding this network facilitated an understanding of

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INNOVATORS & IDEAS: RESEARCH LEADER

Mary L. Phillips: Understanding how the brain regulates itself via the study of neural networks underlying emotional regulation

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Mary L. Phillips, MD, MD (Cantab), Pittsburgh Foundation-Emmerling Endowed Chair in Psychotic Disorders and Distinguished Professor of Psychiatry, Bioengineering, and Clinical and Translational Science at the University of Pittsburgh, is one of the foremost translational affective neuroscientists of her generation. Elected to the National Academy of Medicine in 2024, recipient of the 2024 Society of Biological Psychiatry Gold Medal Award, the 2014 ACNP Joel Elias Award for Outstanding Clinical Research, and the 2017 Brain and Behavior Research Foundation Calvin Prize for Outstanding Achievement in Mood Disorders Research; and the author of more than 400 peer-reviewed publications recognized by Clarivate Analytics as Highly Cited Research from 2018 to 2021, she has built a research program that deploys multimodal neuroimaging to map prefrontal-limbic circuitry abnormalities underlying bipolar disorder, with the overarching goal of converting circuit-level findings into objective biomarkers for earlier diagnosis, risk identification in youth, and targeted neuromodulation and metabolic interventions. In this Genomic Press Interview, Phillips traces a scientific trajectory shaped by intellectual independence and exceptional mentorship, from a pivotal zoology year at Cambridge that introduced her to the Aplysia neural network model, through psychiatry training at the Maudsley Hospital and Institute of Psychiatry in London, to her emergence as a leader in biological psychiatry at the University of Pittsburgh under the mentorship of David Kupfer. She discusses her foundational work demonstrating that abnormal face emotion processing and emotional reactivity serve as behaviorally measurable windows into prefrontal-limbic circuit dysfunction in bipolar disorder, her current work identifying neural circuit biomarkers of mania risk, and her translational agenda examining neurodevelopmental trajectories from infancy through young adulthood to detect risk dimensions before clinical threshold is reached. She also describes the three Phillips Centers she directs: CNCTI-P (Interventional Psychiatry), CENTRIM-BD (Metabolic Psychiatry), and CRTDAN (Translational and Developmental Neuroscience), which together instantiate a comprehensive precision psychiatry infrastructure at the University of Pittsburgh. She has mentored more than 100 trainees across her career, including 15 NIH K awardees, and holds presidential or council roles in major international neuroscience societies. She reflects with candor on gender equity in academic neuroscience, as recognized by the 2023 ACNP Women's Advocacy Award and her inclusion in ResearchGate's Best Female Scientists in the World for 2023 and 2024, and on her vision for a precision psychiatry grounded in individual-level neural circuit data.



Figure 1. Mary L. Phillips, MD, MD (Cantab), University of Pittsburgh, USA.

Part 1: Mary L. Phillips – Life and Career

Where were you born, and where do you live now?
I was born in Nottingham, UK. I now live with my husband in Pittsburgh, Pennsylvania, USA.

Could you give us a glimpse into your personal history, emphasizing the pivotal moments that first kindled your passion for science?
Right from an early age, probably around 5 years old, I wanted to be a doctor. This was due to significant exposure to the medical profession at the time through television dramas. Being a doctor would allow me to help others and earn the respect of my peers. Being academic meant that I was also encouraged by teachers and parents to pursue academic success at school. I think there was one pivotal moment during a biology class at secondary school when I made an apparently controversial

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the next four decades proving it.

The sea slug that changed everything entered her life in her third year of medical school, when her classmates chose the predictable intercalated degrees in pathology, anatomy, or physiology and she chose zoology. It was, by the standards of medical career planning, a strange move. It was also the hinge on which everything turned. In the zoology laboratory, she encountered Aplysia, the large marine sea slug whose neural network had become a kind of Rosetta Stone for understanding how behavior emerges from circuitry. "During my year of Zoology at medical school, I was fascinated by the discovery of the simple

all the behaviors of *Aplysia*," she recalls. The fascination was not passing. It sent her into a master's degree in neuroscience, which she calls "one of the best moves I ever made."

From there, the trajectory bends in ways that would have been invisible from the inside. She trained in neurology. Found psychiatry more interesting. Worried that psychiatry did not take neuroscience seriously enough. Nearly committed to neurology for good. Then a senior colleague mentioned a subspecialty she had never heard of: neuropsychiatry. That single conversation redirected a life. She arrived at the Maudsley Hospital and Institute of Psychiatry in London, and the field of biological psychiatry gained someone who would not let it forget where behavior actually comes from.

Four mentors arrived at four pivotal moments, each teaching something the others could not. Professor David Foster, a visual physiologist, taught her the rigor of research methodology and the craft of scientific writing, and helped her publish her first paper. Professor Jeffrey Gray, a basic neuroscientist at the Maudsley, introduced her to functional Magnetic Resonance Imaging (fMRI, a technology that measures brain activity by detecting changes in blood flow) when the technology was still raw, still unpredictable, still thrilling. But what Gray taught her that mattered most was not technical. It was the importance of listening to colleagues. Then came the invitation that rearranged geography and ambition in equal measure: Professor David Kupfer, the eminent psychiatrist, asked her to cross the Atlantic and join the Department of Psychiatry at the University of Pittsburgh. "David's experience and excellence as a research leader and department chair, along with his kindness and positive reinforcement during my early and subsequent career in Pittsburgh, helped shape my career trajectory in the USA," she says.

The fourth mentor was Professor Lori Altshuler, a consultant on Dr. Phillips's first major American research grant. Altshuler advised on grant writing, discussed findings, and became a friend. She also died. Dr. Phillips speaks of her with the particular tenderness reserved for people who showed you how to live while they were running out of time to do it themselves. "Lori's positive attitude, even during her last days, was inspirational; I shall never forget her."

A 2003 red Ford Thunderbird and a seven-word philosophy round out the portrait of a scientist whose influence extends well beyond the laboratory. Dr. Phillips has mentored more than 100 trainees, including 15 NIH K awardees. She received the 2023 ACNP Women's Advocacy Award and has been named to Research.com's Best Female Scientists in the World for 2023 and 2024. She does not soften her account of the cost of being a woman in this field. "There was a clear disadvantage to being a woman during the early years of my career, for all the obvious, sexist reasons," she states. But there was a counterweight: visibility. She was never anonymous. People remembered her. And being a woman, she believes, helped foster what she calls a "maternalistic" mentoring role that her trainees came to rely on.

Away from the laboratory, she reads detective fiction with the same appetite she brings to neural circuits, drawn to the solving of problems in both. She plays the clarinet and the piano. She cycles and walks through the countryside surrounding Pittsburgh with her husband, whom she

names, without a moment's pause, as her greatest passion. Her greatest fear is not failure, not obscurity, not even the professional oblivion that haunts most academics in quiet hours. It is boredom. And her greatest regret carries the specific weight that only the permanently absent can impose: not being at the bedside when her mother and her brother died.

Asked to name her greatest achievement, Dr. Phillips does not cite the National Academy, or the Gold Medal, or the four hundred papers. She says, "Moving to the USA and establishing and developing a wonderful research team." It is the answer of someone who understands that discoveries belong to the moment but that the people you train carry the work forward into moments you will never see.

Her life philosophy fits on a napkin. Seven words. "Goals and routes: never confuse the two." She has not.

Dr. Mary L. Phillips's Genomic Press interview is part of a larger series, Innovators and Ideas, that highlights the people behind today's most influential scientific breakthroughs. Each interview in the series blends cutting-edge research with personal reflections, offering readers a comprehensive view of the scientists shaping the future. By combining a focus on professional achievements with personal insights, this interview style invites a richer narrative that both engages and educates readers. This format provides an ideal starting point for profiles that explore the scientist's impact on the field, while also touching on broader human themes. More information on the research leaders and rising stars featured in our Innovators and Ideas -- Genomic Press Interview series can be found on our interview website:

<https://interviews.genomicpress.com/>.

The Genomic Press Interview in Brain Medicine titled "Mary L. Phillips: Understanding how the brain regulates itself via the study of neural networks underlying emotional regulation," is freely available via Open Access, starting on 17 March 2026 in Brain Medicine at the following hyperlink: <https://doi.org/10.61373/bm026k.0018>.

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