

# Psychology professor seeks clues to psychiatric disorders in DNA

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Data, data everywhere. In genomics research, there is a data deluge, so innovative ways to analyze all that information will play a critical role in future breakthroughs.

Gitta Lubke, associate professor of psychology at the University of Notre Dame, is at the forefront of developing new [statistical methods](#) to help find [DNA markers](#) that are related to [psychiatric disorders](#)—and spur further research regarding individual patients' conditions.

"Understanding the biological causes of psychiatric disorders and their interplay with [environmental risk factors](#) is a prerequisite of a successful, personalized approach to treatment," Lubke says.

The [DNA data](#) that Lubke and her colleagues use consist of very large numbers of genetic markers—the spots in DNA where [base pairs](#) can differ between people.

"The idea is to check whether more people with a disorder have, for example, 'A' rather than 'T' in a given spot than people without that disorder," Lubke says. "If so, you can look at whether that spot in the genome corresponds to a gene and then look at the protein that is coded and what it does."

The current approach is to test all genetic markers separately, requiring millions of tests, and to use a case/control variable for the disorder. "But that variable often doesn't do justice to something as complex as

[borderline personality disorder](#), for instance," Lubke explains. "Testing each genetic marker separately is not necessarily optimal."

Thus, she and her students are investigating alternative methods and comparing them to the standard approach. To support a project called "MRI: Acquisition of a Data Analytics Cluster for Computational Social Science," Lubke and several colleagues were also recently awarded a \$452,000 grant from the National Science Foundation.

Lubke's other main project right now is a borderline personality study in collaboration with Vrije Universiteit Amsterdam in The Netherlands, where she received her Ph.D.

This collaboration gives her access to a very large data collection—the [Netherlands Twin Register](#), which has been collecting data since the 1980s and recently added a biobank with genetic data and other biomarkers.

The borderline project includes a study on how best to model questionnaire data, a genome-wide search for relevant [genetic markers](#) using standard methods, and the application of alternative methods.

Lubke's other projects with VU range from studies on internalizing and externalizing problems and well-being to a pilot program for graduate-student exchanges that allows a Notre Dame quantitative psychology student to study and research at VU while Notre Dame hosts two of VU's biological psychology students. Moving forward, Lubke hopes to secure additional funding to expand the program and to enhance the student experience by making housing and courses available to visiting students.

"International experience not only looks good on a CV," she says, "but also opens new horizons and offers ample opportunity to collaborate and network."

At Notre Dame, Lubke's research includes projects looking at resilience in later-life, with psychology professor Cindy Bergeman, and the validity and utility of a two-part system for personality disorder diagnosis, with principal investigator Lee Anna Clark, the William J. and Dorothy K. O'Neill Professor of Psychology.

"All of these projects are interesting and fun—my only problem is that I need to come up with a method to somehow stretch the 24 hours a day has," Lubke says.

"I really enjoy the process of discovering bits and pieces of answers, and putting them together. I guess I'd be pretty bored if answers had already been found to all questions. Of course, there's a good bit of frustration at times, but that's part of it."

Lubke takes great pride in being part of Notre Dame's impressive quantitative psychology program, from the far-ranging expertise of faculty to its collaborations with other colleagues inside and outside the department.

"Our faculty represents such a wide scope of different topics within quantitative methodology that you can always find an expert when faced with a specific question. This is a great advantage for students and faculty alike."

In the classroom, Lubke's teaching is directly related to her research. She is currently updating her Mixture Modeling course, for example, to include new approaches to modeling complex human behavior.

"That way students can get new ideas how best to analyze their data, and it benefits my own research."

Lubke says she is inspired by her experience as a student-teacher when

she attended the University of Amsterdam. To address low scores on stats exams, the institution assigned all undergraduates to small work-groups that met several times each week.

"The groups were led by seniors like myself, and our task was to design small, practical and fun exercises that helped students understand stats and actually like it," she recalls. "Figuring out a didactic way of explaining concepts in small steps was the dominant theme, and it's still central in my teaching."

Provided by University of Notre Dame

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