Interdisciplinary PhD position for a doctoral student (m/f/d) with a background in Psychology, Cognitive Science or Education

Interdisciplinary research at the NRW Graduate School
"SecHuman – Brave New World: Security for People in Cyberspace".

Ruhr-Universität Bochum (RUB) is one of the leading research universities in Germany. As a reform-oriented campus university, it uniquely combines the entire range of major scientific fields in one place. The dynamic coexistence of a variety of scientific disciplines offers researchers and students alike unique opportunities for interdisciplinary collaboration.

The Ministry of Culture and Science of North Rhine-Westphalia is funding the continuation of the innovative NRW graduate school SecHuman at the Horst Görtz Institute for IT Security (HGI), one of Europe's leading security research centers, at RUB with around 2.2 million euros. In the NRW graduate school, important problems of modern IT security are jointly investigated by 13 doctoral students from the technical and mathematical fields as well as from the humanities and social sciences. In order to ensure societal relevance, the doctoral research is accompanied by partners from industry and public authorities. 11 of the 13 doctoral positions are located at RUB, one each at TU Dortmund University and one at the FH Dortmund University of Applied Sciences and Arts (subject to approval by the third-party funding body).

Research in SecHuman is based on six interdisciplinary topics, each of which has a challenging technical and humanities/social science issue at its core. Each research topic is investigated by a *PhD tandem*, which consists of one technical/mathematical and one humanities/social science doctoral candidate. The main goal of the NRW graduate school is to place IT security at the service of people and society, and to develop sustainable and resilient solutions. More information about SecHuman school can be found at https://sechuman.rub.de/.

The Research Project
For the SecHuman research project **"Cognitive Aspects of Hacking",** we are looking for an excellent Master's graduate (m/f/d) from the fields of **psychology, cognitive science, education** or related disciplines. An affinity to computer science is also desirable.

The tandem project deals with an important component of modern cyber security, namely obfuscation. Obfuscation techniques are aim to impede reverse engineering of software and hardware, and are widely used in practice. Despite its relevance, this topic has been treated in the literature only from a technical point of view, although humans play a central role here. The main goal of the tandem project is to develop novel hardware obfuscation based on the understanding of human cognition during hardware reverse engineering. A major part of the research project will be the design and implementation of complex studies that can be used to investigate learning processes during hardware reverse engineering. It is of great interest to analyze changes in these learning processes and to derive suggestions for the development of obfuscation techniques.

The research project builds on the tandem project "Learning Processes in IT Security" from the first SecHuman funding phase. The research question was to analyze which cognitive processes play a role during attacks on computer hardware (i.e., hardware reverse engineering) for the first time worldwide. The starting point was to describe the engineers' understanding of an unknown hardware circuit as a problem-solving process. For this, methods of problem solving research were applied. Many important results were achieved in the first tandem project, which were described in conference and journal papers and presented at invited talks at SHB (Security and Human Behavior Workshop) 2018 and 2019 at CMU and Harvard, respectively.

Applicants (m/f/d) should have a strong interest in interdisciplinary work and knowledge transfer. SecHuman is based on a structured Ph.D. program, in which qualification modules consisting of lectures, colloquia, summer/winter schools and internships are completed in addition to the classical dissertation research. The dissertation duration is scheduled for 39 months. At the Ruhr-Universität Bochum, we particularly want to promote the careers of women in areas in which they are underrepresented and particularly welcome applications from female candidates. We also welcome applications from candidates with disabilities.

Applicants (m/f/d) should have the following **profile**:
- Very good master's degree in psychology, education, cognitive science or related fields
- General interest in the topic of IT security
- Strong motivation to work in an interdisciplinary team
- Strong motivation to produce high quality research results on an international level
- Very good communication and English skills

The following points should be noted for applications:
- Start of employment: flexible, desirable is 01.04.2021.
- Duration of employment: 39 months
- Application documents: curriculum vitae, relevant references, letter of motivation (1 page), naming of two persons as references (e-mail addresses)
- Payment according to TV-L 12/13

We look forward to receiving your application by e-mail (as one PDF file) to Anne Thiele M.A. (Coordinator of the College) at sechuman@rub.de by **February 15, 2021**.