

# UNIVERSITY OF SOUTH FLORIDA

## Defense of a Doctoral Dissertation

### Human-centric Cybersecurity Research: From Trapping the Bad Guys to Helping the Good Ones

by

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For the Ph.D. degree in Computer Science and Engineering

Cybersecurity, in general, can be seen as primarily a human problem, and it is for this reason that it requires human solutions and tradeoffs. In order to study this problem, using two perspectives; that of the adversaries and that of the defenders, I investigated human activities in cybersecurity. I researched the adversaries' intentions of successfully breaking into internet of things (IoT) devices through the use of a new honeypot ecosystem in part one of this dissertation. MPMFPot is a multi-phased multi-faceted IoT honeypot framework that was designed to monitor adversaries across multiple stages of deployment. As a result of utilizing MPMFPot, I was able to capture more sophisticated attacks in each phase, allowing me to capture real human activities at the end. Using similarity clustering algorithm, I was also able to determine what the intention of an adversary might be. In the second part of this dissertation, I conducted an ethnographic study of a software development company using the anthropological research method of participant observation for a period of six months. The findings of this study illustrate the nuanced nature of the root causes of software vulnerability and the necessity to consider a significant amount of contextual information in order to better comprehend how and why software vulnerabilities can develop dur