# COLLEGE OF ENGINEERING AND COMPUTER SCIENCE
## FLORIDA ATLANTIC UNIVERSITY

Announces the Ph.D. Dissertation Defense of

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for the degree of Doctor of Philosophy (Ph.D.)

## "Integrating Design Thinking Model and Items Prioritization Decision Support Systems into Requirements Management in Scrum"

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DEPARTMENT:
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ABSTRACT OF DISSERTATION
Integrating Design Thinking Model and Items Prioritization Decision Support Systems into Requirements Management in Scrum

The Agile methodologies have attracted the software development industry's attention due to their capability to overcome the limitations of the traditional software development approaches and to cope with increasing complexity in system development. Scrum is one of the Agile software development processes broadly adopted by industry. Scrum promotes frequent customer involvement and incremental short releases. Despite its popular use, Scrum's requirements engineering stage is inadequately defined which can lead to increase development time and cost, along with low quality or failure for the end products. This research shows the importance of activity planning of requirements engineering in improving the product quality, cost, and scheduling as well as it points out some drawbacks of Agile practices and available solutions. To improve the Scrum requirements engineering by overcoming its challenges in cases, such as providing a comprehensive understanding of the customer's needs and addressing the effects of the challenges in other cases, such as frequent changes of requirements, the Design Thinking model is integrated into the Scrum framework in the context of requirements engineering management. The use of the Design Thinking model, in the context of requirements engineering management, is validated through an in-depth scientific study of the IBM Design Thinking framework. In addition, this research presents an Items Prioritization dEcision Support System (IPESS) which is a tool to assist the Product Owners for requirements prioritization. IPESS is built on information collected in the Design Thinking model. The IPESS tool adopts Analytic Hierarchy Process (AHP) technique and PageRank algorithm to deal with the specified factors and to achieve the optimal order for requirements items based on the prioritization score. IPESS is a flexible and comprehensive tool that focuses on different important aspects including customer satisfaction and product quality. The IPESS tool is validated through an experiment that was conducted in a real-world project.

BIOGRAPHICAL SKETCH
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CONCERNING PERIOD OF PREPARATION
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**Time in Preparation:** 2018 - 2021

**Qualifying Examination Passed: Spring** 2019

**Published Papers:**

- A. Alhazmi and S. Huang, "A Decision Support System for Sprint Planning in Scrum Practice," in Conference Proceedings - IEEE SOUTHEASTCON, 2018, pp. 1–9.
- A. Alhazmi and S. Huang, "Survey on Differences of Requirements Engineering for Traditional and Agile Development Processes," Conf. Proc. - IEEE SOUTHEASTCON, 2020.
- A. Alhazmi and S. Huang, "Integrating Design Thinking into Scrum Framework in the Context of Requirements Engineering Management," Int. Conf. Comput. Sci. Softw. Eng. (CSSE 2020) Beijing China, 2020. pp. 33 – 45.
- A. Alhazmi and S. Huang, "Design Thinking in the Context of Scrum Requirements Engineering Management - Integration and Validation of Use," Journal of Software: Evolution and Process. (Journal – Under Review)
- A. Alhazmi and S. Huang, "A Decision Support System for Prioritizing Product Backlog Items in Scrum Practice." (Conference Paper – In Progress)