



THE UNIVERSITY OF ARIZONA

College of Engineering

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Sekretariát

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Annex No. 10 to the MU Directive on Habilitation Procedures and Professor Appointment Procedures

Habilitation Thesis Reviewer's Report

Applicant: Bruno Rossi, Ph.D.
Habilitation thesis: Experimental Research Towards Software Systems Quality
Reviewer: Tomas Cerny, Ph.D. (tenured in computer science)
Reviewer's institution: Systems & Industrial Engineering College of Engineering, University of Arizona

To start this review report, I would like to highlight a few differences in the tenure review at US institutions, where applicants are limited by the term of 6 years, and report on three areas of research, teaching, and service. The research component typically includes funding activity, which is required. It is quite usual to expect an applicant to secure external funding in the total value of 300-500 thousand USD throughout the tenure process. Publication activity is expected in the range of 1-2 publications per year. In this report, I can only elaborate on the part of the research component focused on publications. I want to highlight that the thesis is in my field of expertise and that while I am faculty at the Systems and Industrial Engineering department, I have tenured in Computer Science.

The thesis considers Software Systems Quality improvement, focuses on automation, and applies empirical software engineering. The research areas are, however, rather broad and not highly cohesive.

On one end, it deals with testing; next, it applies technical debt identification and quality teaching. On the other end, it looks into smart grids, which seem more like two divided clusters. Of quality and smart grids.

Similarly, the first cluster remains rather disjoint while looking into the development process, testing, product quality, reliability, and education. The concern here is that such a broad range limits specialization and likely future grant funding.

For instance, presented works range from agile methods to code reviews, mutation testing, technical debt identification, reliability, and software quality education. It would be reasonable for

the same methods to be evaluated or tested across these areas, but these works seem disjoint. It would make more sense to specialize in reliability research, which most publications seem to be applied.

The second cluster looks into smart grids and cyber-physical systems, which go beyond software engineering. This is more focused on tracing events and big data processing. Consequent work considered smart grid simulations, which seem unrelated to the first cluster.

From the presented works, it is hard to identify a specialization, and obviously, for success in the grant application, one specific area should be the main trajectory of the applicant.

Perhaps one challenge I find as a reviewer of this thesis is that the applicant's works are presented in a listing/enumeration order. I would assume the thesis would present a clear problem statement. So that it would be listed first in the thesis and then considered how individual contributions add pieces to the puzzle to address the problem. The 1.2 Focus of thesis section is rather fuzzy. Possibly, the intent was to prioritize all published work, and consequently, the problem statement cannot be depicted clearly, given the broad focus.

Apart from the thesis, I have assessed citations and venues of applicants' publications using applicant Google Scholar ¹. I have consulted with the UoA tenure chair about general requirements from our candidates, and we expect an h-index of 13. However, it is expected from someone who also secures research funding and applies for tenure in 6 years. Still, the h-index of 17 is above the range. The top-cited publication is a literature review. The next two are 2010 and 2012. The applicant published at core-B and core-A conferences. However, it is unclear from co-authors which of these are mentors, colleagues, and which are supervised students. Various works are published with Tomas Pitner, who might have been a prior supervisor, and then the works lack independence. However, this is beyond my assessment since the thesis does not provide such information.

Moreover, I have used <https://www.connectedpapers.com> to assess selected publications, and most reveal minimal clusters or related works by the same authors, which align with prior observations.

Despite some critical perspectives, there is sufficient evidence that the applicant can perform and supervise independent research in the area and is well cited. This can also be confirmed by observing more recent publications after this thesis.

Reviewer's questions for the habilitation thesis defense

- Could you specify/narrow the problem statement of this thesis into one sentence?
- Which trajectory does the applicant consider pursuing in the next career and why? Where do you see the grant funding opportunities?
- Could you present the committee your thesis-related publications grouped by (1) leading or corresponding author, (2) publications with supervised students where you are the first

¹<https://scholar.google.com/citations?user=SivTOTcAAAAJ&hl=en>

faculty member, (3) publications with other faculty members where you did not have the leading role? The aim is to disambiguate works with obvious leadership from works as a second author after a colleague faculty.

Conclusion

The habilitation thesis entitled "Experimental Research Towards Software Systems Quality" by Bruni Rossi fulfills the requirements expected of a habilitation thesis in the field of Computer Science.

Sincerely yours,

Tomas Cerny
Associate Professor
Systems and Industrial Engineering
College of Engineering, University of Arizona
Date: February 17, 2024



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