Grip on software: understanding development progress of SCRUM sprints and backlogs

Helwerda, L.S.

Curriculum Vitae

Leon Helwerda was born on the 23rd of June, 1992 in Voorburg, the Netherlands. He graduated from the Huygenslyceum in the same locality in 2010. Following that, he enjoyed a year of Mathematics education at Leiden University before switching to Computer Science, obtaining his BSc degree in *Informatica* in 2014 with extracurricular courses included. Following that, he graduated *cum laude* with an MSc degree in Computer Science—Core Computer Science specialization—in 2016. While this education mainly took place at Leiden University, the Master's thesis included experiments performed at CWI, Amsterdam. Continuing his research efforts at the Leiden Institute of Advanced Computer Science (LIACS), Leon embarked on another journey as a PhD student in the *Grip op Software* (GROS) research project, a collaboration between LIACS and Stichting ICTU. As a part of the Imaging and Bio-informatics group, he collaborated with other staff members to set up and maintain systems and aid with research and education.

Publications

- Leon Helwerda et al. “Query compilation for feature extraction in MonetDB”, 2024. Pending submission.
- Leon Helwerda et al. “Estimation models for prediction of sprints and backlogs”. *Empirical Software Engineering*, 2024. Submitted.
- Leon Helwerda et al. “Information visualization in analytical decision support and ecosystem management in agile processes”, 2024. Pending submission.
- Leon Helwerda, Frank Niessink and Fons J. Verbeek. “Conceptual process models and quantitative analysis of classification problems in Scrum software development practices”. In: *Proceedings of the 9th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management* (IC3K 2017 - KDIR). SCITEPRESS, 2017, pp. 357–366. DOI: 10.5220/0006602803570366.

Leon also co-authored the following publications:

- Alan Zammit, Leon Helwerda, René C. L. Olsthoorn, Fons J. Verbeek and Alexander P. Gultyaev. “A database of flavivirus RNA structures with a search algorithm for pseudoknots and triple base interactions”. *Bioinformatics*, vol. 37, no. 7, Aug. 2020, pp. 956–962. DOI: 10.1093/bioinformatics/btaa759.
- Irene Martorelli, Leon Helwerda, Jesse Kerkvliet, Sofia I. F. Gomes, Jorinde Nuytinck, Chivany R. A. van der Werff, Guus J. Ramackers, Alexander P. Gultyaev, Vincent S. F. T. Merckx and Fons J. Verbeek. “Fungal metabarcoding data integration framework for the MycoDiversity DataBase (MDDB)”. *Journal of Integrative Bioinformatics*, vol. 17, no. 1, article 20190046, 2020. DOI: 10.1515/jib-2019-0046.
- K. Joost Batenburg, Leon Helwerda, Walter A. Kosters and Tim van der Meij. “Mobile radio tomography: Agent-based imaging”. In: *BNAIC 2016: Artificial Intelligence*. Communications in Computer and Information Science, vol. 765. Springer, 2017, pp. 63–77. DOI: 10.1007/978-3-319-67468-1_5.

Acknowledgments

During the extended amount of time that it took to finalize the research—in particular writing this dissertation—many people have offered support in one way or another. Without this generous encouragement, it would be hard to imagine in what state the project would be today. Throughout this process, I found that motivation is drawn not only from energy that I am able to exert from myself, but also by the positivity and confidence that others have clearly conveyed. In this section, as the author of this thesis, I would like to thank those that have proven to play an essential role in the realization of this work. I mention some of these people by group, so even if their name is not included here, they still have my greatest appreciation.

Firstly, I thank the people involved in *Grip on Software*. As a project, it has gone through various phases, with pilots and subprojects that inevitably led to people joining and leaving again. But I rather consider GROS as a team, where ambitions and visions have brought it to greater heights. Here, I focus on GROS members from LIACS, but I mention participation from ICTU later on in this section. I thank Fons for proposing the PhD position to me and providing a place where I could grow my skills, both in machine learning research and computer systems in general. Walter, who only officially joined the team late on, has been a cornerstone throughout my education and research, with supervision of both Bachelor and Master thesis as a few indicators. As such, I am glad that the recognition of the role he played all these years that led to this point is now in print as well. I will also mention Aske, who helped kick-start and oversee the project in its early phase. The pilot project—in which Enrique, Thomas and Thomas were involved—helped start this research by demonstrating the potential of data acquisition. By looking beyond data, we found that information visualization would best work toward understanding SCRUM, and work by Laurens helped a lot there. Last but not least, Cas brought along more expertise regarding visualization for software development as well as more help that I could ever know to ask for in the final stages. This has been a source of inspiration during struggles.

There are more people at Leiden University that deserve some credit in helping me through various stages of this process. Due to closeness of my initial office to other people and shared interests with them, an informal group quickly formed, with fitting, unofficial names, ranging from Coffee club—as most enjoyed this beverage during breaks—to the *Fish tank* crew, referring to the office where most of them relocated to later on. In particular, I mention Lise and Irene here, who invited me into the group in the first place, which also included Rens, Dirk, Arie-Willem, Jan, Zé and many others who have come and gone. In the later stages of my PhD track, Kees and Alexandra helped me to find a route through an entanglement of fuzzy paths. Even if some advice was difficult to put in practice for me, it was still appreciated. I would also like to thank Alice for lending a listening ear at various times. Long chats with Chivany are always a nice change of pace, with many topics passing by. I would always feel comfortable during those times with you, Shiv.

More broadly, I have enjoyed working together with staff and students from the *Bio-imaging group*, who have passion for their topics which might feel distanced from my research, but the overlaps are plentiful and collaborations were always productive. This also includes Lu, who has been very understanding of tough situations. More staff to mention here are Jeannette and Jetty, for whom I have happily assisted courses. This is also the case for Kris, where our collaboration extended into technical work as well. I also want to acknowledge the other staff that have been involved in the LIACS *Research and education lab*, namely Vian and Jur. During my final year, I joined the ISSC ALICE team to help with documentation and GPU monitoring for their cluster, and my time with the team was a constructive and enjoyable experience.

Aside from staff and students that were there during various phases of my PhD, there are also the students from earlier years that kept in touch. Of these, it is relevant to at least name Tim, Jerome and Simon, with whom I had good interactions with during our studies and beyond.

As for the GROS project itself, it could not have been anything concrete without the support and input from people over at ICTU. Foremost, Frank has been insightful and practical, with experience and knowledge to back up his advice. Additionally, our meetings and informal talks with quality managers, software delivery managers, Scrum Masters and coaches—as well as other people whose roles do not define them—have been thoughtful, fruitful and compassionate. Particularly, I want to thank the development teams that realize the software on behalf of ICTU for other government agencies. All involved parties have been considerate and permissive to allow us to use their data. I also thank the support teams for enabling a novel setup to acquire the data using decentralized agents in the development ecosystem that they maintained.

Similarly, I thank the people at Wigo4it who helped in our research. Talking with various people to understand the differences between the two governmental organizations brought extra qualitative data, but also new viewpoints to consider.

Finally, I praise my family, namely my parents, Remco and Marian, as well as my sisters, Daphne and Renate. They have shown engagement and—once I found how to ask—patience and flexibility, which has been important throughout this process.

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