

Interactive systems for the collaborative authoring, refinement and reuse of scientific presentation materials

Duration : 36 months
Team : [Loki](#) (Inria centre at the University of Lille & CRISTAL)
Supervisor : Sylvain Malacria (sylvain.malacria@inria.fr)
Location : Inria Centre at University of Lille (Villeneuve d'Ascq)
Deadline : 30/04/2026

The Loki group is looking for a PhD student in fall 2026. This PhD will investigate how interactive systems could better support the collaborative authoring, refinement and delivery of scientific presentation materials.

Description of the PhD

Summary

The objective of this PhD is to propose new paradigms of interaction and design guidelines for interactive systems that better support the collaborative production of scientific presentation materials (slide-decks), not only their *authoring* but also their *refinement* and *reuse*.

Presentations are one of the main communication medium, typically used by researchers during conference events, lab visits, popularization and job interviews. Authoring these presentation is not only a long process, but it also relies on collecting feedback from collaborators, or may require to integrate presentations previously produced by them.

The PhD will explore this process in detail, design novel systems that facilitate the collaborative initial authoring of presentations, propose contextualized feedback collection systems that will better integrate in the workflow of authors/presenters, design dedicated rehearsal systems, and reflect on file structures that can better accommodate this collaborative process.

Research group

The Loki research group at the Inria centre at university of Lille is a research team in partnership with Université de Lille within the Joint Research Unit UMR 9189 CNRS-Centrale Lille-Université de Lille, CRISTAL. Their research aims at producing original ideas, fundamental knowledge and practical tools to inspire, inform and support the design of human-computer interactions. They favor the vision of computers as tools, would like them to empower people, and we believe this can only be achieved by supporting both transparent (from a cognitive perspective) and analytic use. They are focusing on how such tools can be designed and engineered, and propose as a long-term goal to specify and create new technology dedicated to interaction.

Context

Every year, an increasing number of presentation materials, such as slide-decks, are produced to be delivered at various events like scientific conferences [1], which is essential for disseminating scientific results. These presentations are typically the result of a group effort that requires coordination and adaptation. Usually, a first draft of the presentation is produced. This first draft, that may or may not rely on previously produced presentations, is then iteratively refined by collecting feedback from co-authors and other colleagues. This feedback collection can happen at different stage, on various form of materials. Among others, it can be by early (a) on the plain text speech, (b) on a spreadsheet with description of the visuals on the side, (c) on a potentially incomplete slide-deck, (d) on screen recording of the presentation with a voiceover, or (e) actual recording of a

presentation in context. Current systems are not adapted to collecting these feedback, fail to contextual them into the actual presentation materials and their precise versions, and do not facilitate authors to implement the corresponding changes.

Problem space

Several presentation textbooks characterize the entire presentation production process into distinct phases, such as planning, building and delivery [2,3,4,5]. Yet, this characterization relegate feedback collection and refinement within the building phase. Similarly, while systems have been proposed to both facilitate the planning [6] and authoring [7] of presentations, as well as making delivery more interactive [8], they fail to tackle the problem more holistically and do not integrate co-authors and collaborators feedback into the process, nor consider situation where presentations build on top of presentations they previously produced.

Nowadays, the trend in system design for presentations consists in lightening the burden of building presentations by automatically generating them [9,10,11]. This approach is largely motivated by the fact that producing presentation materials is seen as a tedious task that takes time to articulate and aggregate materials. Yet, they are wrong to assume that a quality presentation can be automatically generated without requiring authors to make this presentation their own, something that inherently happen while authors are designing and refining them. Moreover, they typically ignore the specificities associated with scientific communication that might require the integration of certain types of materials, or adapt the level of discourse to the audience.

We see the production of presentation materials radically differently. We believe that the production is tedious because software tools have barely evolved in the last decades, beyond cosmetic updates. They do not accommodate how presentation are produced nowadays, that is, largely collaboratively and iteratively.

Objectives

This PhD will be articulated around the three following objectives.

Characterize the collaborative production process of scientific presentations. A first objective is to characterize more finely the current workflow of scientific presentation production, beyond the planning, building, delivery phases. We will conduct surveys and interviews with collaborators to better understand their respective role in this process. We will notably explore the context of co-authoring where more than one author will present, typically co-first authors of papers. We will also explore the longer lifecycle of presentations, where parts of presentations from collaborators are re-used for future presentations, typically when a Professor aggregates the work of supervised students in a novel research talk.

Design collaborative presentation production systems. A second objective is to design collaborative systems that facilitate the authoring and refinement of scientific presentations. We will go beyond simple collaborative slide-decks [12,13] and reflect on systems that facilitate the collaborative authoring of polymorphic and interactive multimedia documents [14,15], the collaborative refinement of speech and visuals, and situations where authors reuse [16] previous presentations from collaborators. We will also design novel rehearsal and situated feedback collection systems that will make it easier to collaborators and external feedback provider to provide feedback on different versions of the presentation, depending on the time they can dedicate to it.

Reflect on structures for facilitating advanced collaborative presentations. A third objective is to reflect on file structures that facilitate the collaborative authoring, refinement and delivery of scientific presentations. It will target potential issues such as handling collaborative edits and undos, but also reflect on which structure would be appropriate to accommodate live co-presentations from different computers. We will leverage existing theoretical concepts such as interaction and graphical substrates [17,18,19] as basis for this work.

Approach and method

We will adopt a classical Human-Computer Interaction research approach based on triangulation between theoretical, design and empirical work [20]. The characterization of the task will inform the design of collaborative presentation production systems that will be used to design and implement artefacts that we will evaluate using dedicated experimental procedures. The result of this design and evaluations will both refine the characterization and provide the expectation on adapted file structures.

Nature of digital collaboration

Scientific presentations are collaborative in nature.

(A) because they often present the results of a collaborative work, and as such, could benefit from a better integration of all stakeholders in their elaboration.

(B) because they are used to communicate with an audience, resulting in presenters to frequently ask for feedback from other collaborators.

(C) because presentations are not necessarily delivered by a single presenter.

(D) because an efficient presentation must engage with its audience, a collaboration with it is desirable in the form of interactivity.

The collaboration happens both co-located, distant and hybrid. It also happens at the communication level, between colleagues/presenters for (A) and (B) and with the audience for (D). It also requires to facilitate sharing and coordination between authors and presenters during (A), (B) and (C). This collaboration can be both synchronous and asynchronous, and typically happens at the second/days/weeks level, with rather small groups (unless we consider presentation in front of large audiences). In this PhD, we will focus on (A), (B) and (C).

Contribution to digital collaboration: Expected results and impact

This work will contribute on several levels. Conceptual level first, by characterizing collaboration during all the steps of their production and delivery. Design level by elaborating design guidelines for future presentation tools that better account for collaboration at all stages. Technical level, through various prototypes that will be developed alongside the project and distributed open source. Empirical level through the results of the user experiments conducted during the PhD. Altogether, the contributions will provide the necessary stepping stone to design and develop an advanced collaborative presentation tool that would complement the *Suite Numérique*.

We expect to have a strong scientific impact by disseminating our results in top HCI venues such as ACM CHI, CSCW, DIS and UIST.

Positioning in the eSEMBLE program

This PhD is an integral part of the eSEMBLE program as it focuses on a case study of collaborative practices in the context of presentations. It is particularly in line with the Practices and Infrastructures for Long-term Collaboration targeted project (PC2 Pilot), especially since it is rooted in a specific practice, namely scientific presentations. It will characterize the corresponding workflow more precisely (Axis 1 - Understanding current and future forms of long-term collaboration) and will contribute to reflecting on infrastructure that facilitate the longer term reuse of previously produced presentations (Axis 2 - Open technical frameworks and protocols for long-term collaboration, WP2.2 Interoperability for long-term collaboration). It is a typical case of asymmetric and asynchronous collaboration, depending on each person's role (Axis 3 - Conceptual frameworks for long-term collaboration, in particular WP3.3 Asymmetries and heterogeneity in asynchronous collaboration). And it will provide design guidelines and demonstrators for a collaborative presentation production tool (Axis 4 - Actionable visions for future forms of long-term collaboration).

Furthermore, we are convinced that the demonstrators and design guidelines elaborated during this thesis could serve as an ideal starting point for the creation of an online presentation tool that would perfectly complement [LaSuite numérique](#). From a more ethical perspective, Presentation tools suffer from a situation of dependence on North American tools (Apple, Google, Microsoft, Adobe) and it is crucial that we set about creating a sovereign tool.

Candidate

The candidate must have (or be about to obtain) a Master's degree or equivalent in Computer Science or Human-Computer Interaction, and demonstrate a strong interest in research. They should have experience and a strong interest in interactive software development and design, and strong programming skills, in particular in web-based technologies. Creativity, independence, team spirit and communication skills are valuable assets. Proficiency in technical and scientific English is also required. The candidate will join a vibrant and multicultural group of young researchers at Loki. Our students typically come from different backgrounds (Canada, China, India, Iran, ...). Speaking French is not a requirement to fit into our research group.

To apply, send your resume and a cover letter by email to Sylvain Malacria (sylvain.malacria@inria.fr) with [Application: Interactive systems for the collaborative authoring, refinement and reuse of scientific presentation materials] as object of the e-mail. In addition to what is generally expected, the cover letter should highlight what you find particularly interesting in this topic, why current solutions are limited, as well as describe your overall vision for this project. Ideally, it should also elaborate on why you are interested in working in academic research. All applications are welcome, regardless of age, gender, social or ethnic origin, sexual orientation, or disability. For the integration of people with disabilities, we are working on possible adaptations of the positions to be filled - within the limits of the applicable rules for the safety of people: do not hesitate to contact us to tell us about your situation.

Bibliography

- [1]- National Center for Science and Engineering Statistics. (2025). Publication output by geography and scientific field. Science & Engineering Indicators.
- [2]-Robert Rene Henri Anholt. Dazzle 'em with style: the art of oral scientific presentation. Elsevier Academic Press, Philadelphia, 2nd ed edition, 2006.
- [3]-Jacqueline Gartner-Schmidt. The New Normal – Virtual and Hybrid Presentations: Developing Content, Designing Slides, and Delivery Guidelines. Ear, Nose & Throat Journal, 101 (9 suppl):20S–28S, November 2022. Publisher: SAGE Publications Inc
- [4]-Garr Reynolds. Presentation zen: simple ideas on presentation design and delivery. Voices that matter. New Riders, Berkeley, CA, 2nd ed., rev. & updated edition, 2012.
- [5]-Duarte, N. (2008). Slide: ology: The art and science of creating great presentations. O'Reilly Media.
- [6]-Larissa Pschetz, Koji Yatani, and Darren Edge. 2014. TurningPoint: narrative-driven presentation planning. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14). Association for Computing Machinery, New York, NY, USA, 1591–1594. <https://doi.org/10.1145/2556288.2557389>
- [7]-Yefeng Liu, Darren Edge, and Koji Yatani. 2013. SidePoint: a peripheral knowledge panel for presentation slide authoring. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). Association for Computing Machinery, New York, NY, USA, 681–684. <https://doi.org/10.1145/2470654.2470750>
- [8]-Debaleena Chattopadhyay, Kenton O'Hara, Sean Rintel, and Roman Rädle. 2016. Office Social: Presentation Interactivity for Nearby Devices. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). Association for Computing Machinery, New York, NY, USA, 2487–2491. <https://doi.org/>

[10.1145/2858036.2858337](https://doi.org/10.1145/2858036.2858337)

- [9]-Liang, X., Zhang, X., Xu, Y., Sun, S., & You, C. (2025). Slidegen: Collaborative multimodal agents for scientific slide generation. arXiv preprint arXiv:2512.04529.
- [10]-Aggarwal, T., & Bhand, A. (2025). PASS: Presentation Automation for Slide Generation and Speech. arXiv preprint arXiv:2501.06497.
- [11]-Ge, J., Wang, Z. Z., Zhou, X., Peng, Y. H., Subramanian, S., Tan, Q., ... & Darrell, T. (2025). Autopresent: Designing structured visuals from scratch. In Proceedings of the Computer Vision and Pattern Recognition Conference (pp. 2902-2911).
- [12]- FIGMA slides <https://www.figma.com/slides/>
- [13]- google slides <https://google.com/slides>
- [14]-Masson, D. (2023). Transforming the Reading Experience of Scientific Documents with Polymorphism.
- [15]-McMillan, S. (2002). Exploring models of interactivity from multiple research traditions: users, documents, and systems. In L. Lievrouw, S. Livingstone (Eds.) Exploring models of interactivity from multiple research traditions: Users, documents, and systems (pp. 163-182). SAGE Publications, Ltd, <https://doi.org/10.4135/9781848608245.n13>
- [16]-Michel Beaudouin-Lafon and Wendy E. Mackay. 2000. Reification, polymorphism and reuse: three principles for designing visual interfaces. In Proceedings of the working conference on Advanced visual interfaces (AVI '00). Association for Computing Machinery, New York, NY, USA, 102–109. <https://doi.org/10.1145/345513.345267>
- [17]-Wendy E. Mackay and Michel Beaudouin-Lafon. 2025. Interaction Substrates: Combining Power and Simplicity in Interactive Systems. In Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25). Association for Computing Machinery, New York, NY, USA, Article 687, 1–16. <https://doi.org/10.1145/3706598.3714006>
- [18]- Clemens N. Klokmoose, James R. Eagan, Siemen Baader, Wendy Mackay, and Michel Beaudouin-Lafon. 2015. Webstrates: Shareable Dynamic Media. In Proceedings of the 28th Annual ACM Symposium on User Interface Software & Technology (UIST '15). Association for Computing Machinery, New York, NY, USA, 280–290. <https://doi.org/10.1145/2807442.2807446>
- [19]-Nolwenn Maudet, Ghita Jalal, Philip Tchernavskij, Michel Beaudouin-Lafon, and Wendy E. Mackay. 2017. Beyond Grids: Interactive Graphical Substrates to Structure Digital Layout. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). Association for Computing Machinery, New York, NY, USA, 5053–5064. <https://doi.org/10.1145/3025453.3025718>
- [20]-Wendy E. Mackay and Anne-Laure Fayard. 1997. HCI, natural science and design: a framework for triangulation across disciplines. In Proceedings of the 2nd conference on Designing interactive systems: processes, practices, methods, and techniques (DIS '97). Association for Computing Machinery, New York, NY, USA, 223–234. <https://doi.org/10.1145/263552.263612>