

NICOLE B. SULTANUM

University of Toronto

PhD Student in Computer Science

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ABOUT ME

My field of expertise is **human-data interaction** (i.e., **human-computer interaction (HCI)** and **data visualization**) with a special interest in **text visualization** (i.e., visual strategies to help navigate and make sense of large text collections). I also have an extensive background in applied research, having worked on a wide range of projects from engineering and medicine to arts & design, education and games, both in academia and in industry.

EDUCATION

University of Toronto, Canada – Department of Computer Science, Fall 2015-present

PhD In Computer Science (*ongoing*)

- Supervisors : *Fanny Chevalier and Michael Brudno*

University of Calgary, Canada – Department of Computer Science, Fall 2009- Summer 2011

MSc in Computer Science, August 2011

- Thesis : *Exploring Novel Interfaces for 3D Visualization of Reservoir Simulation Post-Processing Data*
- Supervisors : *Mario Costa Sousa and Ehud Sharlin*

Federal University of Pernambuco (UFPE), Brazil, Informatics Centre (*Centro de Informática - CIn*), 2004-2008

BSc in Computer Science, August 2008

- Graduation Research Project Title: *Interactive Ink Brushstroke Simulation via Tablets* (original title: *“Simulação interativa de traços em tinta e pincel através do tablet”*)
- Supervisor: *Silvio Melo*
- GPA: *9.31/10.0*

PROFESSIONAL EXPERIENCE

Autodesk Research

Research Intern, December 2020 – April 2021

Industry research on HCI and Data Vis, focused on the exploration and navigation of meeting transcripts and recordings.

Adobe Research

Research Intern, January 2020 – April 2020

Industry research on HCI and Data Vis, focused on text + graphics linking and storytelling approaches for data stories.

Microsoft Research

Research Intern, June 2019 – August 2019

Industry research on HCI for AI aimed at the design and evaluation of a machine teaching language for object detection.

IBM Research Brazil

Research Software Engineer, June 2012 – July 2015

Industry research on Visualization and HCI applied to Natural Resources, with efforts also encompassing project proposal elaboration, patents, publications and multidisciplinary development.

Department of Computer Science, University of Calgary, Canada - Interactive Reservoir Modeling and Visualization Research Group

Research Assistantship, November 2011 – May 2012

Interactive models and platforms for visualization on oil /gas exploration and production, with a focus on interactive multi-touch displays and surface computing technology for visual interactive exploration petroleum data.

GCF Sistemas

Professional Traineeship, March 2008 – June 2009

C# Development and project management of applications for commerce and ERP.

AWARDS

Monica Ryckman Bursary

Toronto, Jan 2022 – C\$5,000

Awarded to Computer Science Students at the University of Toronto.

Doctoral Completion Award

Toronto, Jan 2021 – C\$7,445 and Jan 2022 – C\$7,980

Competitively awarded to PhD students in good academic standing outside of their funded cohort.

Didi Graduate Student Award

Toronto, Sept 2019 – C\$10,000

Awarded to Computer Science MSc or PhD students working in Knowledge representation, computer vision, human computer interaction, edge computing, machine learning, or social computing, chosen on the basis of academic standing and research potential.

Ontario Graduate Scholarship

Toronto, Sept-2019 to Aug 2020 – C\$15,000

Jointly funded by the Province of Ontario and the University of Toronto, granted to graduate students in all disciplines on the basis of academic merit.

General Motors Women in Science and Mathematics Award

Toronto, April 2019 – C\$5,000

Awarded to women graduate students who are enrolled in a program in science or mathematics in the Faculty of Arts & Science.

Robert E. Lansdale/Okino Computer Graphics Graduate Fellowship in DGP (Dynamic Graphics Project)

Toronto, November 2018 – C\$2,000

Scholarship awarded to a graduate student in the Department of Computer Science's Dynamic Graphics Project on the basis of academic merit.

Mitacs Globalink Research Award for Research Abroad

Toronto, May 2018 – C\$6,000

Competitive funding for senior undergraduate and graduate students, and postdoctoral fellows in Canada to conduct 12–24-week research projects at universities overseas. Funds supported a 4-month research visit at Inria-Saclay, France, under Prof. Anastasia Bezerianos, from October 2018 to January 2019.

Wolfond Scholarship Program in Wireless Information Technology

University of Toronto, Sept 2015 to Aug 2017 – C\$20,000

The Wolfond Scholarship in Wireless Information Technology was established by Greg Wolfond to recognize outstanding scholars pursuing research in areas relating to mobile computing, wireless information technology, networks, human-computer interaction, and digital media.

Top of Class Award – 9.31/10.0

Federal University of Pernambuco (UFPE), Aug 2008

Honors status granted to the student with highest overall average in the Computer Science class of 2008.1 (i.e., 2008 1st Semester).

PUBLICATIONS

1. **N. Sultanum**, F. Naeem, M. Brudno, F. Chevalier. [2022] **ChartWalk: Navigating Large Collections of Text Notes in Electronic Health Records for Clinical Chart Review**. In IEEE Transactions on Visualization and Computer Graphics (TVCG). (*full paper, to appear, Honorable Mention*)
2. **N. Sultanum**, A. Bezerianos, F. Chevalier. [2021] **Text Visualization and Close Reading for Journalism with Storifier**. In 2021 IEEE Visualization Conference (VIS'21), October 2021. (*short paper*)
3. **N. Sultanum**, F. Chevalier, Z. Bylinskii, Z. Liu. [2021] **Leveraging Text-Chart Links to Support Authoring of Data-Driven Articles with VizFlow**. Proceedings of ACM SIGCHI 2021 (CHI'21), May 2021. (*full conference paper*)
4. **N. Sultanum**, C. Murad, D. Wigdor. [2020] **Understanding and Supporting Academic Literature Review Workflows with LitSense**. Proceedings of the International Conference on Advanced Visual Interfaces (AVI'20), September 2020. (*short paper*)

5. **N. Sultanum**, S. Ghorashi, C. Meek, G. Ramos. [2020] **A Teaching Language for Building Object Detection Models**. Proceedings of the 2020 ACM Designing Interactive Systems Conference (DIS'20). pp. 1223–1234, July 2020. (*full paper, Honorable Mention*)
6. J. Zhang, **N. Sultanum**, A. Bezerianos, F. Chevalier. [2020] **DataQuilt: Extracting Visual Elements from Images to Craft Pictorial Visualizations**. Proceedings of ACM SIGCHI 2020 (CHI'20), April 2020. (*full paper*)
7. **N. Sultanum**, D. Singh, M. Brudno, F. Chevalier. [2019]. **Doccurate: A Curation-Based Approach for Clinical Text Visualization**. IEEE Transactions on Visualization and Computer Graphics (TVCG), 25.1, pp.142-151, January 2019. (*journal paper*).
8. **N. Sultanum**, M. Brudno, D. Wigdor, F. Chevalier. [2018] **More Text Please! Understanding and Supporting the Use of Visualization for Clinical Text Overview**. Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI'18), p. 422, April 2018, Canada. (*full paper, Honorable Mention*).
9. **N. Sultanum**, P. Thaine, M. Brudno, M. Glueck, D. Wigdor and F. Chevalier. [2017] **MedStory: Unlocking the Qualitative Power of Medical Narratives**. Proceedings of 8th Workshop on Visual Analytics in Healthcare (VAHC'17), October 2017, Phoenix, Arizona. (*2-page extended abstract + poster*).
10. M.A.S. Netto, R.L.F. Cunha, **N. Sultanum**. [2015] **Deciding When and How to Move HPC Jobs to the Cloud**. IEEE Computer 11, pp. 86-89, November 2015 (*magazine article*)
11. **N. Sultanum**, M. Motta, C. Cardonha and R. Herrmann. [2014] **Watchboard: Curated Microblogging for the Enterprise**. Proceedings of CHI'14 Extended Abstracts on Human Factors in Computing Systems, pp. 2107-2112, May 2014, Toronto, Canada (*extended abstract + poster*)
12. **N. Sultanum**, E.V. Brazil and M.C. Sousa. [2013] **Navigating and Annotating 3D Geological Outcrops Through Multi-touch Interaction**. Proceedings of ACM International Conference on Interactive Tabletops and Surfaces (ITS '13), pp. 345-348, October 2013, St Andrews, UK (*extended abstract + poster*)
13. M. Tozser, **N. Sultanum**, E. Sharlin, K. Rutheford and C. Foster [2012] **Re-collision: a collision reconstruction forensics tabletop**. Proceedings of ACM International Conference on Interactive Tabletops and Surfaces (ITS '12), pp. 81-84, November 2012, Cambridge, MA (*short paper*)
14. P. Lapides, **N. Sultanum**, E. Sharlin and M.C. Sousa [2012] **Seamless Mixed Reality Tracking in Tabletop Reservoir Engineering Interaction**. Proceedings of the International Working Conference on Advanced Visual Interfaces (AVI '12), pp. 725-728, May 2012, Anacapri, Italy (*extended abstract + poster*)
15. **N. Sultanum**, S. Somanath, E. Sharlin and M.C. Sousa [2011] **"Point it, Split it, Peel it, View it": Techniques for Interactive Reservoir Visualization on Tabletops**. Proceedings of ACM International Conference on Interactive Tabletops and Surfaces (ITS '11), pp. 192-201, November 2011, Kobe, Japan (*full paper*)
16. J. Harris, J. Young, **N. Sultanum**, P. Lapides, E. Sharlin and M.C. Sousa [2011] **Designing Snakey: A Tangible User Interface Supporting Well Path Planning**. Proceedings of 13th IFIP TC13 Conference on Human-Computer Interaction (INTERACT '11), pp. 45-53, September 2011, Lisbon, Portugal (*short paper*).
17. J. Harris, J. Young, **N. Sultanum**, P. Lapides, E. Sharlin and M.C. Sousa [2011] **Snakey: A Tangible User Interface for Well Path Planning in the Context of Reservoir Engineering**. Technical Report 2011-1003-15, May 26, 2011, Department of Computer Science, University of Calgary, AB, Canada
18. **N. Sultanum**, E. Sharlin, M.C. Sousa, D.N. Miranda-Filho and R. Eastick [2010] **"Touching the Depths": Introducing Tabletop Interaction to Reservoir Engineering**. Proceedings of the ACM Conference on Interactive Tabletops and Surfaces (ITS '10), pp. 105-108, November 2010, Saarbrücken, Germany (*short paper*)
19. **N. Sultanum** and S. Melo [2008] **SketchSim: Interactive Simulation of Ink Brushstrokes**. Workshop of Undergraduate Work - WUW, in Electronic Proceedings of XXI Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI '08), October 2008, Campo Grande, Brazil (*extended abstract + poster*)
20. Gurgel, **N. Sultanum**, R. Lopes Arcoverde, E.W. Almeida, P. Tedesco [2006] **A Importância de Avaliar a Usabilidade dos Jogos: A Experiência do Virtual Team**. V Brazilian Symposium on Computer Games and Digital Entertainment (SBGames), November 2006, Recife, Brazil (*full paper, in Portuguese*)
21. A.S. Gomes, C. Araújo, D. Arruda, **N. Sultanum**, L. Paiva, L. Menezes [2006] **Participação de professores de matemática no desenvolvimento de aplicações educativas computacionais para o ensino de estruturas aditivas**. Electronic Proceedings of Pernambuco Meeting on Mathematics Teaching (EPEM '06), 2006, Caruaru, Brazil (*workshop paper, in Portuguese*)

PATENTS (authors listed in alphabetical order)

1. M.A.S. Netto, **N. Sultanum** and R.L.F. Cunha, International Business Machines Corp [2018]. **User interface and system supporting user decision making and readjustments in computer-executable job allocations in the cloud.** US Patent Application 15/989,276. Filing 2018-05-25 • **Grant 2018-09-04** • Publication 2018-09-04
2. K. Mantripragada, U. Mello, R.H. Nemoto, L.C.V. Real and **N. Sultanum**, International Business Machines Corp [2017] **System and method for tracking pollution.** U.S. Patent Application 15/840,470. Filing 2017-12-13 • **Grant 2019-04-23** • Publication 2019-04-23
3. C.H. Cardonha, S. Mazon, D.L.N.C. Pereira, and **N. Sultanum**, International Business Machines Corp [2017] **Contextual text adaptation.** U.S. Patent 9,519,871. Filing 2016-08-02 • **Grant 2017-06-06** • Publication 2017-06-06
4. C.H. Cardonha, R.A. de Paula and **N. Sultanum**, International Business Machines Corp, [2017] **Personalized content selection for time-constrained sessions.** U.S. Patent Application 15/084,804. Filing 2016-03-30 • **Grant 2021-11-09** • Publication 2017-10-05
5. C.H. Cardonha, and **N. Sultanum**, International Business Machines Corp [2017] **System and method for the identification of personal presence and for enrichment of metadata in image media.** U.S. Patent 9,798,742. Filing 2015-12-21 • **Grant 2017-10-24** • Publication 2017-10-24
6. C.H. Cardonha, R.G. Herrmann, M.M. Motta and **N. Sultanum**, International Business Machines Corp [2015] **Personalized aggregator for organizing and publishing public and private content.** U.S. Patent Application 14/624,931. Filing 2015-02-18 • **Grant 2018-04-17** • Publication 2018-04-17
7. C.H. Cardonha, R.G. Herrmann, M.M. Motta, and **N. Sultanum**, International Business Machines Corp [2017] **Generating navigable content overviews.** U.S. Patent 9,582,574. Filing 2015-01-06 • **Grant 2017-02-28** • Publication 2017-02-28
8. A.P. Binotto, K. Mantripragada, , A.C.N. Junior, M.A.S. Netto , **N. Sultanum** and L.P. Tizzei, International Business Machines Corp [2016] **Efficient facilitation of human review and computational analysis.** U.S. Patent Application 14/537,180. Filing 2014-11-10 • Publication 2016-05-12
9. F.L. Koch and **N. Sultanum**, International Business Machines Corp [2017] **Non-subjective quality analysis of digital content on tabletop devices.** U.S. Patent 9,842,341. Filing 2014-04-30 • **Grant 2017-12-12** • Publication 2017-12-12
10. K. Mantripragada, L. V. Real, **N. Sultanum**, International Business Machines Corp [2014] **Apparatus and methods for co-located social integration and interactions.** U.S. Patent Application 13/969,077. Filing 2013-02-06 • Publication 2014-08-07

INVITED RESEARCH TALKS & SEMINARS

Dagstuhl Seminars (by invitation only)

- Visual Text Analytics (2022)

Invited Talk: Bridging the (Visual) Gap for Comprehensive Understanding of Clinical Text

- Carleton University (2022)
- Microsoft Research, Cambridge (2019)
- Ontario Tech University (UOIT) (2019)
- Uncharted (2019)
- The Centre for Addiction and Mental Health (CAMH) (2019)

Invited Talk: Information Visualization – Computing for Medicine

- University of Toronto, Canada (2018)

Invited Talk: Introduction to Data Visualization: Theory and Practice (Full day workshop)

- University of Toronto, Canada (2017)
- LNCC (Laboratório Nacional de Computação Científica), Brazil (2014) (in portuguese)

Invited Talk: Exploring Novel Interfaces for 3D Visualization of Reservoir Flow Simulation Data

- University of Bristol, UK (2011)

Invited Talk: Exploring Novel Interfaces for 3D Visualization of Reservoir Simulation Post-Processing Data

- Heriot-Watt University, UK (2011)
- Imperial College London, UK (2011)
- Federal University of Pernambuco (UFPE) (2011)

Invited Talk: Interactive Collaborative Visualization for Reservoir Engineering

- Federal University of Pernambuco (UFPE) (2010)

TEACHING EXPERIENCE

Teaching Assistantship, University of Toronto

- Topics in Information Visualization (Fall 2019, Fall 2020, Fall 2021)
- Introduction to Data Visualization (for Stats) (Winter 2021) (Course design assistantship)
- Introduction to Data Science (Winter 2019)
- Introduction to Data Science (Summer 2018) (Course design assistantship)
- The Design of Interactive Comp. Media (Winter 2018, Winter/Fall 2016, Fall 2015)
- Topics in Computational Biology – Computational Methods in Medicine (Winter 2018)
- Theory and Methods in Knowledge Media Design (Fall 2017)
- Video Game Design (Winter 2017)
- Information Architecture (Fall 2016)

Teaching Assistantship, University of Calgary

- Introduction to Human-Robot Interaction (Winter 2012) (Course advisor)
- Introduction to Human-Computer Interaction (Fall 2009)

Teaching Assistantship, Federal University of Pernambuco (UFPE)

- Image Processing: 1st semester 2007
- Theory of Computation: 2nd semester 2006
- Logics for Computer Science: 1st semester 2005 - 1st semester 2006 (3 semesters)
- Introduction to Programming: 2nd semester 2004 - 1st semester 2006 (4 semesters)

SERVICE EXPERIENCE

Organizing Chair

- IEEE Visualization & Visual Analytics 2021 (**VIS**) – *Student Volunteer Co-chair* – 2021
- ACM CHI Conference on Human Factors in Computing Systems (**CHI**) – *Student Volunteer Co-chair* – 2020, 2021

Associate Chair / Program Committee

- International Conference on Graphics, Visualization & Human-Computer Interaction (**GI**) – 2020
- ACM CHI Conference on Human Factors in Computing Systems (**CHI**) – *Late Breaking Work* – 2018

Reviewer

- ACM CHI Conference on Human Factors in Computing Systems (**CHI**) – 2016, 2017, 2020-2022
- IEEE Conference on Visualization (**VIS**) – 2018-2022
- ACM Symposium on User Interface Software and Technology (**UIST**) – 2021-2022
- EG/VGTC Conference on Visualization (**EuroVis**) – 2019
- International Conference on Graphics, Visualization & Human-Computer Interaction (**GI**) – 2018, 2020
- International Conference on Human-Computer Interaction with Mobile Devices and Services (**MobileHCI**) – 2017
- IEEE International Symposium on Robot and Human Interactive Communication (**RO-MAN**) – 2017
- ACM International Conference on Tangible, Embedded and Embodied Interaction (**TEI**) – 2013-2015
- ACM Conference on Computer-Supported Cooperative Work and Social Computing (**CSCW**) – 2014

Student Volunteer

- IEEE Conference on Visualization (**VIS**) – 2019, 2020
- ACM CHI Conference on Human Factors in Computing Systems (**CHI**) – 2012, 2017-2019
- ACM User Interface Software and Technology Symposium (**UIST**) - 2018
- ACM International Conference on Interactive Surfaces and Spaces (**ISS**) – 2016
- ACM International Conference & Exhibition on Computer Graphics and Interactive Techniques (**SIGGRAPH**) – 2009-2011