



Universiteit  
Leiden

The Netherlands

## Visual analytics for spatially resolved omics data at single cell resolution: methods & applications

Somarakis, A.

### Citation

Somarakis, A. (2022, January 20). *Visual analytics for spatially resolved omics data at single cell resolution: methods & applications*. Retrieved from <https://hdl.handle.net/1887/3250550>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3250550>

**Note:** To cite this publication please use the final published version (if applicable).

# LIST OF PUBLICATIONS

## Journal Publications

A. Somarakis, M. E. Ijsselsteijn, B. Kenkhuis, V. v. Unen, S. J. Luk, F. Koning, L. v. d. Weerd, N. F. C. C. d. Miranda, B. P. F. Lelieveldt, and T. Höllt, “Visual Analysis of Tissue Images at Cellular Level,” in *EuroVis 2021 - Dirk Bartz Prize*, The Eurographics Association, 2021. doi: 10.2312/evm.20211074

M. E. Ijsselsteijn\*, A. Somarakis\*, B. Lelieveldt, T. Höllt<sup>+</sup>, and N. F. de Miranda<sup>+</sup>, “Semi-automated background removal limits data loss and normalizes imaging mass cytometry data,” *Cytometry Part A*, vol. 99, no. 12, pp. 1187–1197, 2021. doi: 10.1002/cyto.a.24480

B. Kenkhuis\*, A. Somarakis\*, L. de Haan, O. Dzyubachyk, M. E. Ijsselsteijn, N. F. de Miranda, B. P. Lelieveldt, J. Dijkstra, W. M. van Roon-Mom, T. Höllt, and L. van der Weerd, “Iron loading is a prominent feature of activated microglia in alzheimer’s disease patients,” *Acta neuropathologica communications*, vol. 9, no. 1, pp. 1–15, 2021. doi: 10.1186/s40478-021-01126-5

A. Somarakis, M. E. Ijsselsteijn, S. J. Luk, B. Kenkhuis, N. F. C. C. de Miranda, B. P. F. Lelieveldt, and T. Höllt, “Visual cohort comparison for spatial single-cell omics-data,” *IEEE Transactions on Visualization and Computer Graphics*, vol. 27, no. 2, pp. 733–743, 2021. doi: 10.1109/tvcg.2020.3030336

A. Somarakis, V. V. Unen, F. Koning, B. P. Lelieveldt, and T. Höllt, “ImaCytE: visual exploration of cellular microenvironments for imaging mass cytometry data,” *IEEE Transactions on Visualization and Computer Graphics*, vol. 27, no. 1, pp. 98–110, 2021. doi: 10.1109/tvcg.2019.2931299

Z. Abdulrahman, S. Santegoets, G. Sturm, P. Charoentong, M. Ijsselsteijn, A. Somarakis, T. Höllt, F. Finotello, Z. Trajanoski, S. v. Egmond, D. Mustafa, M. Welters, N. d. Miranda, and S. v. d. Burg, “35 Chemokine-driven spatial organization of immune cell microaggregates marks oropharyngeal squamous cell carcinomas containing tumor-specific T cells,” *Journal for ImmunoTherapy of Cancer*, vol. 9, no. Suppl 2, pp. A41–A41, 2021. doi: 10.1136/jitc-2021-SITC2021.035

B. Kenkhuis, A. Somarakis, L. R. Kleindouwel, W. M. van Roon-Mom, T. Höllt, and L. van der Weerd, “Co-expression patterns of microglia markers Iba1, TMEM119 and P2RY12 in Alzheimer’s disease,” *bioRxiv*, 2021. doi: 10.1101/2021.05.31.446375

---

\*,<sup>+</sup> Contributed equally

D. Lähnemann, J. Köster, E. Szczurek, D. J. McCarthy, S. C. Hicks, M. D. Robinson, C. A. Vallejos, K. R. Campbell, N. Beerenwinkel, A. Mahfouz, L. Pinello, P. Skums, A. Stamatakis, C. S. O. Attolini, S. Aparicio, J. Baaijens, M. Balvert, B. de Barbanson, A. Cappuccio, G. Corleone, B. E. Dutilh, M. Florescu, V. Guryev, R. Holmer, K. Jahn, T. J. Lobo, E. M. Keizer, I. Khatri, S. M. Kielbasa, J. O. Korb, A. M. Kozlov, T. H. Kuo, B. P. Lelieveldt, I. I. Mandoiu, J. C. Marioni, T. Marschall, F. Mölder, A. Niknejad, L. Raczkowski, M. Reinders, J. de Ridder, A. E. Saliba, **A. Somarakis**, O. Stegle, F. J. Theis, H. Yang, A. Zelikovsky, A. C. McHardy, B. J. Raphael, S. P. Shah, and A. Schönhuth, “Eleven grand challenges in single-cell data science,” *Genome Biology*, vol. 21, 2020. doi: 10.1186/s13059-020-1926-6

N. Li, V. van Unen, N. Guo, T. Abdelaal, **A. Somarakis**, J. Eggermont, A. Mahfouz, S. M. C. de Sousa Lopes, B. P. Lelieveldt, and F. Koning, “Early-life compartmentalization of immune cells in human fetal tissues revealed by high-dimensional mass cytometry,” *Frontiers in Immunology*, vol. 10, 2019. doi: 10.3389/fimmu.2019.01932

### **Awards**

Third Prize for the Dirk Bartz Award for Visual Computing in Medicine 2021

Honorable mention for the Karl Heinz Höhne Award for Medical Visualization 2021

# CURRICULUM VITÆ

Antonios Somarakis was born in Heraklion, Crete at the 11<sup>th</sup> of November in 1992. After graduating from the 2<sup>nd</sup> General High School of Heraklion, he studied Electrical and Computer Engineering in the National Technical University of Athens. In April 2016, he obtained his 5-year Diploma with a major in Signal Processing and minor in Biomedical Engineering. He conducted his Diploma Thesis on the compression of ECG signal in collaboration with Erasmus University Medical Center.

After his introduction to the Dutch Academia, he started his PhD project in February 2017 on the visual analytics for spatial omics data under the supervision of Boudewijn Lelieveldt and Thomas Höllt in Leiden University Medical Center (LUMC). During the PhD project, he focused, in close collaboration with clinical researchers from LUMC, on problems related to the analysis of highly multiplexed cellular images.

In parallel with his PhD work, he remained socially active being, among others, member of the Leo Leiden PhD association and TU Delft Ambassadors.



# ACKNOWLEDGEMENTS

First of all, I would like to express my gratitude towards Boudewijn Lelieveldt and Thomas Höllt. Dear Boudewijn, thank you for believing in me and providing me with the opportunity to start this PhD project. Your research enthusiasm and support all these years was the ideal context for conducting high-end research. Dear Thomas, you are for me a paradigm of scientific excellence and integrity. Your scientific perfectionism shaped, to a great extent, my research profile, thank you. Also, I am more than grateful having Fons Verbeek as my copromotor.

I would like to thank all the members of LKEB family for our daily associations, especially my roommates in our “Crete”-office- island and my collaborators in LUMC, Marieke, Boyd, Sietse, Ziena, Vincent, Juliette, Li Na, Nannan, Noel, Frits, Louise. Special thanks to my students, Jan and Ismigul. They taught more than I did.

Moreover, being part of the DSO community was a blessing. The scientific plurality of projects broadened my perception on the usefulness of Data Science for the promotion of scientific research.

Finally, I would like to thank those that mattered most during this journey. The friends that I met in the Netherlands, those that continue to honour me with their friendship even they were far away and of course, the cornerstone of all, my family.