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Closing the loop: fully automated radiotherapy planning for head and neck cancer

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Citation

Gao, R. (2026, September 16). *Closing the loop: fully automated radiotherapy planning for head and neck cancer*. Retrieved from <https://hdl.handle.net/1887/4309664>

Version: Publisher's Version

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

List of Publications

Journal articles

Jun Ma, Feifei Li, Sumin Kim, Reza Asakereh, Bao-Hiep Le, Dang-Khoa Nguyen-Vu, Alexander Pfefferle, Muxin Wei, **Ruochen Gao**, Donghang Lyu, et al., "Efficient MedSAMs: Segment Anything in Medical Images on Laptop", arXiv preprint arXiv:2412.16085, 2024.

Ruochen Gao, Prerak Mody, Chinmay Rao, Frank Dankers, and Marius Staring, "On Factors that Influence Deep Learning-Based Dose Prediction of Head and Neck Tumors", *Physics in Medicine & Biology*, vol. 70, no. 11, p. 115006, 2025.

Donghang Lyu, **Ruochen Gao**[†], and Marius Staring, "MCP-MedSAM: A Powerful Lightweight Medical Segment Anything Model Trained with a Single GPU in Just One Day", *Machine Learning for Biomedical Imaging*, vol. 3, pp. 135–151, May 2025.

Ruochen Gao, Marius Staring, and Frank Dankers, "Clinical DVH metrics as a loss function for 3D dose prediction in head and neck radiotherapy", accepted for publication in the *International Journal of Computer Assisted Radiology and Surgery (IJCARS)*, CARS 2026 Special Issue.

Ruochen Gao, Noud van Ruremonde, Alice Onderwater, Martin de Jong, Marius Staring, and Frank Dankers, "Automated Head and Neck Radiotherapy Planning from Deep Learning-Based Dose Prediction via Dose Mimicking", submitted, 2026.

International conference proceedings

Ruochen Gao, Donghang Lyu, and Marius Staring, "Swin-LiteMedSAM: A lightweight box-based segment anything model for large-scale medical image datasets", in *Medical Image Segmentation Challenge*, pp. 70–82, Cham: Springer Nature Switzerland, 2024.

Ruochen Gao, Prerak Mody, Chinmay Rao, Frank Dankers, and Marius Staring, "Deep Learning-Based Dose Prediction for Head and Neck Tumors: Influence of Loss Function and Model Architecture", *Radiotherapy and Oncology*, vol. 206, pp. S2792–S2794, 2025.

Portfolio

Leiden University Medical Center Graduate School

Graduate School Courses

- Introductory Meeting of Leiden University
- Scientific Conduct for PhDs
- Code Management with Git
- Basic Methods and Reasoning in Biostatistics

ASCI School Courses

- A Programmer's Guide for Modern High-Performance Computing
- Computer Vision by Learning

Summer School

- AI4Health Summer School, Paris (2025)

International Conferences

- Medical Imaging with Deep Learning (MIDL), Zurich (2022)
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Online (2024)
- European Society for Radiotherapy and Oncology (ESTRO), Vienna (2025)
- Computer Assisted Radiology and Surgery (CARS), Nagoya (2026)

Awards

- Segment Anything in Medical Images on Laptop CVPR 2024 Challenge; Team Leader, 4th Place
- Generalizable Dose Prediction for Heterogeneous Multi-Cohort and Multi-Site Radiotherapy Planning AAPM 2025 Challenge; Team Leader, 3rd Place

Supervision

- Co-supervision of a Bachelor's student, Vrije Universiteit Amsterdam (VU Amsterdam)
- Co-supervision of a Master's student, Technische Universiteit Delft (TU Delft)

Acknowledgements

When I arrived in the Netherlands in early 2022, it was both my first visit to Europe and a time when the country was still under COVID-19 lockdown. Everything felt unfamiliar, and the language barrier and cultural differences made the beginning both exciting and challenging. Looking back, I could never have imagined how quickly Leiden would come to feel like home. Over the past four years, I have grown both academically and personally. Although the final stage of a PhD inevitably brings pressure, it also brings determination. As an international student, completing a PhD in a country that was once entirely unfamiliar is an achievement that I will always cherish.

First and foremost, I would like to express my deepest gratitude to my promotor, Marius. I still vividly remember you picking me up at the entrance of LUMC on my first day, and over the following years, through our 157 supervision meetings, your dedication, guidance, and unwavering support shaped me as a researcher and made this thesis possible.

I am equally grateful to my co-promotor, Frank. The many hours we spent organizing data, discussing results, and refining every detail of our work, together with your signature “double-space check,” taught me the importance of precision and attention to detail—lessons that will continue to guide me throughout my career.

I am grateful to Boudewijn, Chair of the LKEB, for creating such a supportive, collaborative, and inspiring research environment. Every conversation with you left me encouraged, especially as a young researcher. I also sincerely appreciate the extension you granted me, which allowed me to complete this thesis successfully. I will always be thankful for your trust and support.

I would also like to thank all my colleagues at the LKEB. Michèle, thank you for providing me with an excellent workstation—definitely not just a computer. Patrick and Jeroen, thank you for hosting the Thursday LKEB Drinks, which always offered a welcome opportunity to relax after work. Chinmay and Laurens, thank you for the countless conversations, jokes, and laughter in the office. Viktor, I will always remember the conversations we shared by the shore of Lake Zurich, imagining what the future might hold for us. Donghang, thank you for standing shoulder to shoulder with me as we worked toward our deadlines. Jenia and Fredrik, thank you for the memorable summer school in Paris and for sharing a wonderful French dinner despite the extraordinary summer heat. Yunjie and Mody, thank you for your valuable advice and support throughout my PhD research. I also gratefully acknowledge Jingnan, Xiaowu, Yanli, Xiaotong, Chang, Niels, Vincent, Li-Hsin, Qiuyu, Efe, Soumyadeep,

Frederieke, Zichen, Noud, and Els for their help, encouragement, and support over the years.

Beyond academia, I am grateful to the many friends who supported me throughout these years. I would like to thank Rongqi and Wenbin for helping me settle into a completely new country during my first days in the Netherlands. My sincere thanks also go to Fu, Shidi, Yang, and Yu. Although we worked in different departments at LUMC, our regular gatherings and lasting friendship brought joy throughout my PhD journey. Wen, thank you for showing me the Huawei campus and introducing me to its corporate culture. Xiyuan, thank you for taking the time to show me around Harvard and sharing your experiences there. Jue, I still remember the many meals we shared in the dining halls at Peking University, and I truly appreciate you driving to pick me up when I flew back to China.

My heartfelt thanks go to Chen. We arrived in Leiden in the same year, met here, and now graduate in the same year; looking back, it feels less like coincidence and more like destiny. We cooked together, watched movies together, walked our dog together, and quietly turned ordinary days into extraordinary memories. Thank you for making these years brighter than I could have imagined.

Finally, my greatest debt of gratitude is to my parents. Every step that has brought me here has been built upon your unconditional love, endless encouragement, and countless sacrifices. You have always believed in me, even during the moments when I doubted myself. Although thousands of kilometers separated us for many years, your support never felt distant. This thesis is not only the culmination of my PhD, but also a reflection of everything you have given me throughout my life. I dedicate this achievement to you with all my love and gratitude.

Curriculum Vitae

Ruochen Gao was born in Tongling, Anhui Province, China, in August 1996. In September 2011, he began his studies at Tongling No. 1 High School and graduated in June 2014. In September 2014, he began his undergraduate studies in Communication Engineering at Hunan University and graduated in June 2018. In September 2018, he began his master's studies in Computer Science at the University of Chinese Academy of Sciences and graduated in June 2021. From April 2021 to December 2021, he spent some time with a startup and got a brief taste of startup life until the company came to an end in late 2021. In February 2022, he began his PhD studies at the Laboratorium voor Klinische en Experimentele Beeldverwerking (LKEB), Leiden University Medical Center, in the Netherlands. His PhD research focuses on automated radiotherapy planning for head and neck cancer using deep learning techniques.