

# Riqiang Gao, Ph.D.

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## Research Interest

2015–now    📌 I am broadly interested in artificial intelligence, especially its applications in healthcare. My dream is to develop “gentle-and-strict” models that are 1) easy to implement and user-friendly (*gentle*), and 2) motivated by practical challenges and theoretically solid (*strict*).

## Research Experiences

04/2022 – now    📌 Senior AI Scientist, *Deep Reinforcement Learning/Deep Learning for Healthcare*, Siemens Healthineers

08/2018 – 03/2022    📌 Research Assistant, *Lung Cancer Risk Estimation*, Vanderbilt University, Advisor: Prof. Bennett Landman

05/2021 – 09/2021    📌 Research Intern, *Anomaly Detection with Generative Models*, Siemens Healthineers, Mentor: Dr. Zhoubing Xu

09/2015 – 05/2018    📌 Research Assistant, *Face Recognition and Computer Vision*, Tsinghua University

03/2018 – 06/2018    📌 Research Intern, *Whole Slide Image Analysis*, Imsight Technology

06/2017 – 09/2017    📌 Research Intern, *Clothes Detection*, YouTu X-Lab of Tencent

## Education

| Degree | Major              | University               | Period            | GPA rank |
|--------|--------------------|--------------------------|-------------------|----------|
| Ph.D.  | Computer Sci.      | Vanderbilt University    | 08/2018 - 03/2022 | N/A      |
| M.E.   | Electronics Eng.   | Tsinghua University      | 09/2015 - 07/2018 | 2 / 54   |
| B.E.   | Communication Eng. | Central South University | 09/2011 - 07/2015 | 2 / 163  |

## Selected Honors & Awards

2021    📌 MICCAI Traveling Award (first-author)  
📌 C.F. Chen Best Paper Award (with 5,000 USD), Vanderbilt University (first-author)  
📌 RFW Best Student Paper Award Finalist, SPIE-MI 2021 (first-author) (< 2%)

2020    📌 RFW Best Student Paper Award Finalist, SPIE-MI 2020 (first-author) (< 2%)  
📌 Honorable Mention Poster Award, SPIE-MI 2020 (Mentor & Presenter) (< 5%)

2015    📌 Member of Outstanding Deeds Report (10 selected across all majors, < 0.5%)  
📌 Outstanding Graduate in Hunan Province, China (2%)

2014    📌 Meritorious in Mathematical Contest in Modeling of USA (team-leader) (10%)  
📌 Pacemaker to Merit Student of CSU (30 selected across all majors, < 0.5%)

2013    📌 First Prize in National Mathematics Competitions (not-math-major) of China (Rank 17 in China, Rank 1 in Hunan Province, < 0.02%)

## Selected Honors & Awards (continued)

2012 – now     ■ Scholarships including Outstanding Scholarship (CSU, <1%), National Scholarship (CSU, < 2%), First Prize Scholarship (THU, 10%), Dean's Graduate Fellowship (VU).

## Selected Publications (Contact Author \*)

### Journal Articles

- 1 Tang, Y., **Gao, Riqiang**, Han, S., Chen, Y., Gao, D., Nath, V., Bermudez, C., Savona, M. R., Bao, S., Lyu, I. Et al. (n.d.). Body part regression with self-supervision. *IEEE Transactions on Medical Imaging*.
- 2 **Gao, Riqiang**, Li, T., Tang, Y., Xu, K., Khan, M., Kammer, M., Antic, S. L., Deppen, S., Huo, Y., Lasko, T. A. Et al. (2022). Reducing uncertainty in cancer risk estimation for patients with indeterminate pulmonary nodules using an integrated deep learning model. *Computers in Biology and Medicine*.
- 3 **Gao, Riqiang**, Tang, Y., Khan, M. S., Xu, K., Paulson, A. B., Sullivan, S., Huo, Y., Deppen, S., Massion, P. P., Sandler, K. L., & Landman, B. A. (2021). Cancer risk estimation combining lung screening ct with clinical data elements. *Radiology: Artificial Intelligence*.
- 4 **Gao, Riqiang**, Huo, Y., Bao, S., Tang, Y., Antic, S. L., Epstein, E. S., Deppen, S., Paulson, A. B., Sandler, K. L., Massion, P. P., & Landman, B. A. (2020). Multi-path xd recurrent neural networks for collaborative image classification. *Neurocomputing*.
- 5 **Gao, Riqiang**, Tang, Y., Xu, K., Huo, Y., Bao, S., Antic, S. L., Epstein, E. S., Deppen, S., Paulson, A. B., Sandler, K. L., Massion, P. P., & Landman, B. A. (2020). Time-distanced gates in long short-term memory networks. *Medical Image Analysis (C.F. Chen best paper (VU))*.
- 6 **Gao, Riqiang**, Yang, F., Yang, W., & Liao, Q. (2018). Margin loss: Making faces more separable. *IEEE Signal Processing Letters*, 25(2), 308–312.
- 7 Yang, F., Yang, W., **Gao, Riqiang**, & Liao, Q. (2017). Discriminative multidimensional scaling for low-resolution face recognition. *IEEE Signal Processing Letters*, 25(3), 388–392.
- 8 Yang, W., **Gao, Riqiang \***, & Liao, Q. (2017). Weighted voting of discriminative regions for face recognition. *IEICE TRANSACTIONS on Information and Systems*, 100(11), 2734–2737.
- 9 Tang, Y., **Gao, Riqiang**, Han, S., Chen, Y., Gao, D., Nath, V., Bermudez, C., Savona, M. R., Abramson, R. G., Bao, I., Shunxing Lyu, Huo, Y., & Landman, B. A. (2020a). High-resolution 3d abdominal segmentation with random patch network fusion. *Medical Image Analysis*.

### Conference Proceedings

- 1 **Gao, Riqiang**, Lou, B., Xu, Z., Comaniciu, D., & Kamen, A. (2023). Flexible- $c^m$  gan: Towards precise 3d dose prediction in radiotherapy, In *Ieee/cvf conference on computer vision and pattern recognition*.
- 2 **Gao, Riqiang**, Xu, Z., Chabin, G., Mansoor, A., Ghesu, F.-C., Georgescu, B., Landman, B. A., & Grbic, S. (2022). You may need both good-gan and bad-gan for anomaly detection, In *Openreview*.
- 3 Tang, Y., **Gao, Riqiang**, Lee, H., Yang, Q., Yu, X., Zhou, Y., Bao, S., Huo, Y., Spraggins, J., Virostko, J. Et al. (2021). Pancreas ct segmentation by predictive phenotyping, In *International conference on medical image computing and computer-assisted intervention*. Springer.
- 4 **Gao, Riqiang**, Tang, Y., Xu, K., Kammer, M. N., Antic, S. L., Deppen, S., Sandler, K. L., Massion, P. P., Huo, Y., & Landman, B. A. (2021). Deep multi-path network integrating incomplete biomarker and chest ct data for evaluating lung cancer risk, In *Medical imaging: Image processing*. SPIE (**RFW all-conference best paper finalist**).

- 5 **Gao, Riqiang**, Tang, Y., Xu, K., Lee, H. H., Deppen, S., Sandler, K., Massion, P., Lasko, T. A., Huo, Y., & Landman, B. A. (2021). Lung cancer risk estimation with incomplete data: A joint missing imputation perspective, In *International conference on medical image computing and computer-assisted intervention*. (early accepted & travel award).
- 6 **Gao, Riqiang**, Li, L., Tang, Y., Antic, S. L., Paulson, A. B., Huo, Y., Sandler, K. L., Massion, P. P., & Landman, B. A. (2020). Deep multi-task prediction of lung cancer and cancer-free progression from censored heterogenous clinical imaging, In *Medical imaging: Image processing*. SPIE (RFW all-conference best paper finalist).
- 7 Yang, Y., **Gao, Riqiang \***, Tang, Y., Antic, S. L., Deppen, S., Huo, Y., Sandler, K. L., Massion, P. P., & Landman, B. A. (2020). Internal-transfer weighting of multi-task learning for lung cancer detection, In *Medical imaging: Image processing*. SPIE (Honorable Mentioned Poster, \* denotes Mentor).
- 8 **Gao, Riqiang**, Huo, Y., Bao, S., Tang, Y., Antic, S. L., Epstein, E. S., Balar, A. B., Deppen, S., Paulson, A. B., Sandler, K. L. Et al. (2019). Distanced lstm: Time-distanced gates in long short-term memory models for lung cancer detection. MICCAI-MLMI (oral).
- 9 **Gao, Riqiang**, Yang, W., Hu, X., & Liao, Q. (2016). Two-stage patch-based sparse multi-value descriptor for face recognition, In *Visual communications and image processing (vcip)*, IEEE.
- 10 Yang, W., **Gao, Riqiang \***, Xu, Y., Sun, X., & Liao, Q. (2016). Discriminative patch-based sparse representation for face recognition, In *Ieee international conference on signal processing, communications and computing (icspcc)*. IEEE.
- 11 **Gao, Riqiang**, Yang, W., Sun, X., Li, H., & Liao, Q. (2015). Locally collaborative representation in similar subspace for face recognition, In *Chinese conference on biometric recognition*. Springer.

## Mentored Students in Vanderbilt

|                   |  |
|-------------------|--|
| 01/2020 - 05/2020 | ■ Qingyun Qian (master). First Job: Engineer in Huawei.                        |
| 01/2019 - 06/2019 | ■ Yiyuan Yang (bachelor). First Job: Engineer in Facebook.                     |
| 07/2019 - 09/2019 | ■ Lingfeng Li (bachelor). First Job: MS student in Northwestern University.    |
| 01/2020 - 05/2020 | ■ Xinmeng Zhang (bachelor). First Job: Ph.D. student in Vanderbilt University. |

## Academic Activities

|                   |   |
|-------------------|---|
| Program Committee | ■ ICCV2021 Workshop on Computer Vision for Automated Medical Diagnosis<br>ICML 2021 Workshop Interpretable ML in Healthcare   |
| Reviewer          | ■ Transactions on Medical Imaging (TMI)<br>Journal of Biomedical and Health Informatics (JBHI)<br>Computer Methods and Programs in Biomedicine (CMPB)<br>PLOS One<br>Research in Computational Molecular Biology (RECOMB2020)<br>Cancers (co-reviewed with Dr. Pierre Massion)<br>Medical Physics |