

# Stanford

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## Curtis Langlotz

Professor of Radiology (Thoracic Imaging), of Medicine (Biomedical Informatics Research), of Biomedical Data Science and Senior Fellow at the Stanford Institute for HAI

### CLINICAL OFFICE (PRIMARY)

- **Stanford Hospital and Clinics**

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### ACADEMIC CONTACT INFORMATION

- **Administrative Contact**

Jacqueline Thomas

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### Bio

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#### BIO

Dr. Langlotz is Professor of Radiology, Medicine, and Biomedical Data Science at Stanford University. His laboratory investigates the use of deep neural networks and other machine learning technologies to detect disease and eliminate diagnostic errors through analysis of medical images and clinical notes. He also serves as Associate Director of Stanford's Institute for Human-Centered Artificial Intelligence and as Director of the Center for Artificial Intelligence in Medicine and Imaging (AIMI Center), which supports over 150 Stanford faculty conducting interdisciplinary artificial intelligence research that optimizes how clinical data are used to promote health. As Associate Chair for Information Systems and a Medical Informatics Director for Stanford Health Care, Dr. Langlotz is responsible for the computer technology that supports the Stanford Radiology practice, including 20 million imaging studies that occupy 2 petabytes of storage.

He has published over 200 scholarly articles and is author of the book "The Radiology Report: A Guide to Thoughtful Communication for Radiologists and Other Medical Professionals". He has led many national and international efforts to improve the quality of radiology communication, including the RadLex™ terminology standard, the RadLex™ Playbook of radiology exam codes, the RSNA report template library, and a technical standard for communication of radiology templates.

Raised in St. Paul, Minnesota, Dr. Langlotz received his undergraduate degree in Human Biology, Master's in Computer Science, MD in Medicine, and PhD in Medical Information Science, all from Stanford University. He is a founder and past president of the Radiology Alliance for Health Services Research (RAHSR) and has served as president of the Society for Imaging Informatics in Medicine (SIIM), and the College of SIIM Fellows. He is a former board member of the Association of University Radiologists (AUR), the American Medical Informatics Association (AMIA) and the Society for Medical Decision Making (SMDM). He currently serves as President of the Radiological Society of North America (RSNA).

Dr. Langlotz is a recipient of the Lee B. Lusted Research Prize from the Society of Medical Decision Making and the Career Achievement Award from the Radiology Alliance for Health Services Research. He and his trainees have received numerous scientific awards, including seven best paper awards and five research career development grants. He has founded several healthcare information technology companies, including Montage Healthcare Solutions, which was acquired by Nuance Communications in 2016.

## **CLINICAL FOCUS**

- Diagnostic Radiology

## **ACADEMIC APPOINTMENTS**

- Professor - University Medical Line, Radiology
- Professor - University Medical Line, Medicine - Biomedical Informatics Research
- Professor - University Medical Line, Biomedical Data Science
- Senior Fellow, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Bio-X

## **ADMINISTRATIVE APPOINTMENTS**

- Director, Center for Artificial Intelligence in Medicine and Imaging, (2018- present)
- Associate Director, Institute for Human-Centered Artificial Intelligence, (2023- present)
- Physician Lead, Imaging AI, Stanford Health Care, (2024- present)
- Associate Chair for Information Systems, Department of Radiology, (2014-2024)
- Medical Informatics Director for Radiology, Stanford Health Care, (2014-2024)

## **HONORS AND AWARDS**

- Lee B. Lusted Research Prize, Society for Medical Decision Making (1986)
- GERRAF Career Development Award, Association of University Radiologists (1993)
- Best Information Technology Company, New Jersey Technology Council (2001)
- Fellow, American College of Medical Informatics (2008)
- Fellow, Society for Imaging Informatics in Medicine (2010)
- Lifetime Achievement Award, Radiology Alliance for Health Services Research (2017)

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- President, Radiological Society of North America (2024 - present)
- Chair of the Board, Radiological Society of North America (2022 - 2023)
- Board of Directors, Radiological Society of North America (2016 - 2023)
- President, College of Imaging Informatics Fellows (2015 - 2018)
- President, Society for Imaging Informatics in Medicine (2006 - 2008)
- Board of Directors, Association for University Radiologists (2003 - 2010)
- Founder and President, Radiology Alliance for Health Services Research (2002 - 2004)
- Board of Trustees, Society for Medical Decision Making (1996 - 1998)

## **PROFESSIONAL EDUCATION**

- Residency: Hospital of the University of Pennsylvania, Department of Radiology (1994) PA
- Internship: Hospital of the University of Pennsylvania Primary Care (1990) PA
- Medical Education: Stanford University School of Medicine (1989) CA
- AB, Stanford University , Human Biology (1981)
- MS, Stanford University , Computer Science: Artificial Intelligence (1983)
- MD, Stanford University , Medicine (1989)

- PhD, Stanford University , Medical Information Sciences (1989)
- Board Certification: Diagnostic Radiology, American Board of Radiology (1994)

## PATENTS

- Curtis Langlotz. "United States Patent 6,366,683 Apparatus and Method for Recording Image Analysis Information", Radiological Society of North America, Apr 2, 2002

## LINKS

- Center for Artificial Intelligence in Medicine and Imaging: <https://aimi.stanford.edu/>
- Langlotz Lab: <https://langlotzlab.stanford.edu/>
- Google Scholar: <https://scholar.google.com/citations?user=WQkBYwQAAAAJ&hl=en>
- @curtlanglotz: <https://twitter.com/curtlanglotz>
- Curt Langlotz: <https://www.linkedin.com/in/langlotz/>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My laboratory employs deep neural networks and other machine learning technologies to design algorithms that detect and classify disease on medical images. We also develop natural language processing methods that use narrative radiology reports to create large annotated image training sets for supervised machine learning experiments. The resulting systems provide real-time decision support for radiologists to improve accuracy and reduce errors. We are committed to enabling the clinical use of ideas conceived in the laboratory. When our results show potential, we evaluate their utility in the reading room or the clinic and disseminate them as open source or commercial software.

### CLINICAL TRIALS

- Validation of an Artificial Intelligence-based Algorithm for Skeletal Age Assessment, Not Recruiting

## Teaching

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### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Zhihong Chen, Sophie Ostmeier

#### Doctoral Dissertation Co-Advisor (NonAC)

Kevin Wu

#### Doctoral (Program)

Maya Varma

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biomedical Informatics (Masters Program)
- Biomedical Informatics (Phd Program)
- Clinical Informatics (Fellowship Program)

## Publications

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### PUBLICATIONS

- **Adapted large language models can outperform medical experts in clinical text summarization.** *Nature medicine*

- Van Veen, D., Van Uden, C., Blankemeier, L., Delbrouck, J. B., Aali, A., Bluethgen, C., Pareek, A., Polacin, M., Reis, E. P., Seehofnerová, A., Rohatgi, N., Hosamani, P., Collins, et al  
2024
- **Organizational Factors in Clinical Data Sharing for Artificial Intelligence in Health Care.** *JAMA network open*  
Youssef, A., Ng, M. Y., Long, J., Hernandez-Boussard, T., Shah, N., Miner, A., Larson, D., Langlotz, C. P.  
2023; 6 (12): e2348422
  - **The Future of AI and Informatics in Radiology: 10 Predictions.** *Radiology*  
Langlotz, C. P.  
2023; 309 (1): e231114
  - **Automated deidentification of radiology reports combining transformer and "hide in plain sight" rule-based methods.** *Journal of the American Medical Informatics Association : JAMIA*  
Chambon, P. J., Wu, C., Steinkamp, J. M., Adleberg, J., Cook, T. S., Langlotz, C. P.  
2022
  - **Implementation of Clinical Artificial Intelligence in Radiology: Who Decides and How?** *Radiology*  
Daye, D., Wiggins, W. F., Lungren, M. P., Alkasab, T., Kottler, N., Allen, B., Roth, C. J., Bizzo, B. C., Durniak, K., Brink, J. A., Larson, D. B., Dreyer, K. J., Langlotz, et al  
2022: 212151
  - **Moving Toward Seamless Interinstitutional Electronic Image Transfer.** *Journal of the American College of Radiology : JACR*  
Larson, D. B., Krishnaraj, A., Mendelson, D. S., Langlotz, C. P., Wald, C.  
1800
  - **Automated coronary calcium scoring using deep learning with multicenter external validation.** *NPJ digital medicine*  
Eng, D., Chute, C., Khandwala, N., Rajpurkar, P., Long, J., Shleifer, S., Khalaf, M. H., Sandhu, A. T., Rodriguez, F., Maron, D. J., Seyyedi, S., Marin, D., Golub, et al  
2021; 4 (1): 88
  - **Artificial Intelligence Algorithm Improves Radiologist Performance in Skeletal Age Assessment: A Prospective Multicenter Randomized Controlled Trial.** *Radiology*  
Eng, D. K., Khandwala, N. B., Long, J., Fefferman, N. R., Lala, S. V., Strubel, N. A., Milla, S. S., Filice, R. W., Sharp, S. E., Towbin, A. J., Francavilla, M. L., Kaplan, S. L., Ecklund, et al  
2021: 204021
  - **Video-based AI for beat-to-beat assessment of cardiac function.** *Nature*  
Ouyang, D., He, B., Ghorbani, A., Yuan, N., Ebinger, J., Langlotz, C. P., Heidenreich, P. A., Harrington, R. A., Liang, D. H., Ashley, E. A., Zou, J. Y.  
2020; 580 (7802): 252-256
  - **Geographic Distribution of US Cohorts Used to Train Deep Learning Algorithms.** *JAMA*  
Kaushal, A. n., Altman, R. n., Langlotz, C. n.  
2020; 324 (12): 1212-13
  - **Ethics of Using and Sharing Clinical Imaging Data for Artificial Intelligence: A Proposed Framework.** *Radiology*  
Larson, D. B., Magnus, D. C., Lungren, M. P., Shah, N. H., Langlotz, C. P.  
2020: 192536
  - **A Roadmap for Foundational Research on Artificial Intelligence in Medical Imaging: From the 2018 NIH/RSNA/ACR/The Academy Workshop** *RADIOLOGY*  
Langlotz, C. P., Allen, B., Erickson, B. J., Kalpathy-Cramer, J., Bigelow, K., Cook, T. S., Flanders, A. E., Lungren, M. P., Mendelson, D. S., Rudie, J. D., Wang, G., Kandarpa, K.  
2019; 291 (3): 781-91
  - **Assessment of Convolutional Neural Networks for Automated Classification of Chest Radiographs** *RADIOLOGY*  
Dunnmon, J. A., Yi, D., Langlotz, C. P., Re, C., Rubin, D. L., Lungren, M. P.  
2019; 290 (2): 537-44
  - **CheXpert: A Large Chest Radiograph Dataset with Uncertainty Labels and Expert Comparison**  
Irvin, J., Rajpurkar, P., Ko, M., Yu, Y., Ciurea-Ilcus, S., Chute, C., Marklund, H., Haghgoob, B., Ball, R., Shpanskaya, K., Seekins, J., Mong, D. A., Halabi, et al

ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2019: 590–97

- **Will Artificial Intelligence Replace Radiologists?** *Radiology. Artificial intelligence*  
Langlotz, C. P.  
2019; 1 (3): e190058
- **Deep learning for chest radiograph diagnosis: A retrospective comparison of the CheXNeXt algorithm to practicing radiologists** *PLOS MEDICINE*  
Rajpurkar, P., Irvin, J., Ball, R. L., Zhu, K., Yang, B., Mehta, H., Duan, T., Ding, D., Bagul, A., Langlotz, C. P., Patel, B. N., Yeom, K. W., Shpanskaya, et al  
2018; 15 (11)
- **The LOINC RSNA radiology playbook - a unified terminology for radiology procedures** *JOURNAL OF THE AMERICAN MEDICAL INFORMATICS ASSOCIATION*  
Vreeman, D. J., Abhyankar, S., Wang, K. C., Carr, C., Collins, B., Rubin, D. L., Langlotz, C. P.  
2018; 25 (7): 885–92
- **Performance of a Deep-Learning Neural Network Model in Assessing Skeletal Maturity on Pediatric Hand Radiographs** *RADIOLOGY*  
Larson, D. B., Chen, M. C., Lungren, M. P., Halabi, S. S., Stence, N. V., Langlotz, C. P.  
2018; 287 (1): 313–22
- **Expanding a radiology lexicon using contextual patterns in radiology reports.** *Journal of the American Medical Informatics Association : JAMIA*  
Percha, B. n., Zhang, Y. n., Bozkurt, S. n., Rubin, D. n., Altman, R. B., Langlotz, C. P.  
2018
- **Information extraction from multi-institutional radiology reports** *ARTIFICIAL INTELLIGENCE IN MEDICINE*  
Hassanpour, S., Langlotz, C. P.  
2016; 66: 29-39
- **The Radiology Report: A Guide to Thoughtful Communication for Radiologists and Other Medical Professionals (Book)**  
Langlotz, C. P.  
Amazon CreateSpace .2015
- **ACR BI-RADS for breast imaging communication: a roadmap for the rest of radiology.** *Journal of the American College of Radiology*  
Langlotz, C. P.  
2009; 6 (12): 861-863
- **Fundamental measures of diagnostic examination performance: Usefulness for clinical decision making and research** *RADIOLOGY*  
Langlotz, C. P.  
2003; 228 (1): 3-9
- **A METHODOLOGY FOR GENERATING COMPUTER-BASED EXPLANATIONS OF DECISION-THEORETIC ADVICE** *MEDICAL DECISION MAKING*  
Langlotz, C. P., Shortliffe, E. H., Fagan, L. M.  
1988; 8 (4): 290-303
- **ADAPTING A CONSULTATION SYSTEM TO CRITIQUE USER PLANS** *INTERNATIONAL JOURNAL OF MAN-MACHINE STUDIES*  
Langlotz, C. P., Shortliffe, E. H.  
1983; 19 (5): 479-496
- **Checklist for Artificial Intelligence in Medical Imaging (CLAIM): 2024 Update.** *Radiology. Artificial intelligence*  
Tejani, A. S., Klontzas, M. E., Gatti, A. A., Mongan, J. T., Moy, L., Park, S. H., Kahn, C. E.  
2024: e240300
- **Almanac - Retrieval-Augmented Language Models for Clinical Medicine.** *NEJM AI*  
Zakka, C., Shad, R., Chaurasia, A., Dalal, A. R., Kim, J. L., Moor, M., Fong, R., Phillips, C., Alexander, K., Ashley, E., Boyd, J., Boyd, K., Hirsch, et al  
2024; 1 (2)
- **Human-AI Symbiosis: A Path Forward to Improve Chest Radiography and the Role of Radiologists in Patient Care.** *Radiology*  
Geftter, W. B., Prokop, M., Seo, J. B., Raoof, S., Langlotz, C. P., Hatabu, H.  
2024; 310 (1): e232778
- **Perceptions of Data Set Experts on Important Characteristics of Health Data Sets Ready for Machine Learning: A Qualitative Study.** *JAMA network open*

- Ng, M. Y., Youssef, A., Miner, A. S., Sarellano, D., Long, J., Larson, D. B., Hernandez-Boussard, T., Langlotz, C. P.  
2023; 6 (12): e2345892
- **Clinical Text Summarization: Adapting Large Language Models Can Outperform Human Experts.** *Research square*  
Veen, D. V., Uden, C. V., Blankemeier, L., Delbrouck, J. B., Aali, A., Bluethgen, C., Pareek, A., Polacin, M., Reis, E. P., Seehofnerova, A., Rohatgi, N., Hosamani, P., Collins, et al  
2023
  - **The Stanford Medicine data science ecosystem for clinical and translational research.** *JAMIA open*  
Callahan, A., Ashley, E., Datta, S., Desai, P., Ferris, T. A., Fries, J. A., Halaas, M., Langlotz, C. P., Mackey, S., Posada, J. D., Pfeffer, M. A., Shah, N. H.  
2023; 6 (3): ooad054
  - **External validation, radiological evaluation, and development of deep learning automatic lung segmentation in contrast-enhanced chest CT.** *European radiology*  
Dwivedi, K., Sharkey, M., Alabed, S., Langlotz, C. P., Swift, A. J., Bluethgen, C.  
2023
  - **Evaluating progress in automatic chest X-ray radiology report generation.** *Patterns (New York, N.Y.)*  
Yu, F., Endo, M., Krishnan, R., Pan, I., Tsai, A., Reis, E. P., Fonseca, E. K., Lee, H. M., Abad, Z. S., Ng, A. Y., Langlotz, C. P., Venugopal, V. K., Rajpurkar, et al  
2023; 4 (9): 100802
  - **Automatic Detection of Perilunate and Lunate Dislocations on Wrist Radiographs Using Deep Learning.** *Plastic and reconstructive surgery*  
Pridgen, B., von Rabenau, L., Luan, A., Gu, A. J., Wang, D. S., Langlotz, C., Chang, J., Do, B.  
2023
  - **Almanac: Retrieval-Augmented Language Models for Clinical Medicine.** *Research square*  
Zakka, C., Chaurasia, A., Shad, R., Dalal, A. R., Kim, J. L., Moor, M., Alexander, K., Ashley, E., Boyd, J., Boyd, K., Hirsch, K., Langlotz, C., Nelson, et al  
2023
  - **Diagnosis and Treatment of Patients With Suspected Pneumonia in 28 Utah Urgent Care Clinics**  
Dean, N. C., Hart, J. H., Eve, J. R., Butler, A. M., Sakata, T. W., Wallin, A. R., Reid, J. D., Atwood, B. M., Carman, C., Haug, P. J., Kuttler, K. G., Van Uden, C. E., Irvin, et al  
AMER THORACIC SOC.2023
  - **Truth and Transformation: RSNA's Journey Toward Equity.** *Radiographics : a review publication of the Radiological Society of North America, Inc*  
Langlotz, C. P., Mauro, M. A., Mahmood, U., Klein, J. S., Meltzer, C. C., Bhalla, S., Heller, R. E., Scott, J. A., Flanders, A. E., Pandharipande, P. V.  
2023; 43 (4): e239005
  - **Evaluating semi-supervision methods for medical image segmentation: applications in cardiac magnetic resonance imaging.** *Journal of medical imaging (Bellingham, Wash.)*  
Hooper, S. M., Wu, S., Davies, R. H., Bhuvu, A., Schelbert, E. B., Moon, J. C., Kellman, P., Xue, H., Langlotz, C., Ré, C.  
2023; 10 (2): 024007
  - **Toward Expanding the Scope of Radiology Report Summarization to Multiple Anatomies and Modalities**  
Chen, Z., Varma, M., Wan, X., Langlotz, C. P., Delbrouck, J., Boyd-Graber, J., Okazaki, N., Rogers, A.  
ASSOC COMPUTATIONAL LINGUISTICS-ACL.2023: 469-484
  - **ViLLA: Fine-Grained Vision-Language Representation Learning from Real-World Data**  
Varma, M., Delbrouck, J., Hooper, S., Chaudhari, A., Langlotz, C., IEEE  
IEEE COMPUTER SOC.2023: 22168-22178
  - **A case for reframing automated medical image classification as segmentation**  
Hooper, S. M., Chen, M. F., Saab, K., Bhatia, K., Langlotz, C., Re, C., Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.  
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023
  - **A hybrid modelling approach for abstracting CT imaging indications by integrating natural language processing from radiology reports with structured data from electronic health records.**  
Khan, A., Wu, J., Choi, E., Graber-Naidich, A., Henry, S., Wakelee, H. A., Kurian, A. W., Liang, S., Leung, A., Langlotz, C., Backhus, L. M., Han, S. S.  
AMER ASSOC CANCER RESEARCH.2023
  - **Developing medical imaging AI for emerging infectious diseases.** *Nature communications*

- Huang, S., Chaudhari, A. S., Langlotz, C. P., Shah, N., Yeung, S., Lungren, M. P.  
2022; 13 (1): 7060
- **Improved Fine-Tuning of In-Domain Transformer Model for Inferring COVID-19 Presence in Multi-Institutional Radiology Reports.** *Journal of digital imaging*  
Chambon, P., Cook, T. S., Langlotz, C. P.  
2022
  - **Expert-level detection of pathologies from unannotated chest X-ray images via self-supervised learning.** *Nature biomedical engineering*  
Tiu, E., Talius, E., Patel, P., Langlotz, C. P., Ng, A. Y., Rajpurkar, P.  
2022
  - **Optimizing the Breast Imaging Report for Today and Tomorrow.** *Journal of breast imaging*  
McGrath, A. L., McGinty, G., Berg, W. A., Mendelson, E. B., Drotman, M. B., Ellis, R. L., Langlotz, C. P.  
2022; 4 (4): 343-345
  - **Deep Learning Preoperative Risk Stratification.** *The Annals of thoracic surgery*  
Ouyang, D., Hiesinger, W., Langlotz, C.  
2022
  - **ViLMedic: a framework for research at the intersection of vision and language in medical AI**  
Delbrouck, J., Saab, K., Varma, M., Eyuboglu, S., Dunnmon, J. A., Chambon, P., Zambrano, J., Chaudhari, A., Langlotz, C. P., Assoc Computat Linguist  
ASSOC COMPUTATIONAL LINGUISTICS-ACL.2022: 23-34
  - **Designing clinically translatable artificial intelligence systems for high-dimensional medical imaging** *NATURE MACHINE INTELLIGENCE*  
Shad, R., Cunningham, J. P., Ashley, E. A., Langlotz, C. P., Hiesinger, W.  
2021; 3 (11): 929-935
  - **Biomedical and clinical English model packages for the Stanza Python NLP library.** *Journal of the American Medical Informatics Association : JAMIA*  
Zhang, Y., Zhang, Y., Qi, P., Manning, C. D., Langlotz, C. P.  
2021
  - **Long-term survival in patients with post-LVAD right ventricular failure: multi-state modelling with competing outcomes of heart transplant.** *The Journal of heart and lung transplantation : the official publication of the International Society for Heart Transplantation*  
Shad, R., Fong, R., Quach, N., Bowles, C., Kasinpila, P., Li, M., Callon, K., Castro, M., Guha, A., Suarez, E. E., Lee, S., Jovinge, S., Boeve, et al  
2021
  - **Regulatory Frameworks for Development and Evaluation of Artificial Intelligence-Based Diagnostic Imaging Algorithms: Summary and Recommendations** *JOURNAL OF THE AMERICAN COLLEGE OF RADIOLOGY*  
Larson, D. B., Harvey, H., Rubin, D. L., Irani, N., Tse, J. R., Langlotz, C. P.  
2021; 18 (3): 413-24
  - **Predicting post-operative right ventricular failure using video-based deep learning.** *Nature communications*  
Shad, R., Quach, N., Fong, R., Kasinpila, P., Bowles, C., Castro, M., Guha, A., Suarez, E. E., Jovinge, S., Lee, S., Boeve, T., Amsallem, M., Tang, et al  
2021; 12 (1): 5192
  - **Improving Factual Completeness and Consistency of Image-to-Text Radiology Report Generation**  
Miura, Y., Zhang, Y., Tsai, E., Langlotz, C. P., Jurafsky, D., Assoc Computat Linguist  
ASSOC COMPUTATIONAL LINGUISTICS-ACL.2021: 5288-5304
  - **Beyond the AJR: "Deep Learning Using Chest Radiographs to Identify High-Risk Smokers for Lung Cancer Screening Computed Tomography: Development and Validation of a Prediction Model".** *AJR. American journal of roentgenology*  
Patel, B. N., Langlotz, C. P.  
2020
  - **The Project Baseline Health Study: a step towards a broader mission to map human health** *NPJ DIGITAL MEDICINE*  
Arges, K., Assimes, T., Bajaj, V., Balu, S., Bashir, M. R., Beskow, L., Blanco, R., Califf, R., Campbell, P., Carin, L., Christian, V., Cousins, S., Das, et al  
2020; 3 (1): 84
  - **Integrating artificial intelligence into the clinical practice of radiology: challenges and recommendations.** *European radiology*  
Recht, M. P., Dewey, M., Dreyer, K., Langlotz, C., Niessen, W., Prainsack, B., Smith, J. J.

2020

- **AppendiXNet: Deep Learning for Diagnosis of Appendicitis from A Small Dataset of CT Exams Using Video Pretraining.** *Scientific reports*  
Rajpurkar, P. n., Park, A. n., Irvin, J. n., Chute, C. n., Bereket, M. n., Mastrodicasa, D. n., Langlotz, C. P., Lungren, M. P., Ng, A. Y., Patel, B. N.  
2020; 10 (1): 3958
- **Impact of a deep learning assistant on the histopathologic classification of liver cancer.** *NPJ digital medicine*  
Kiani, A. n., Uyumazturk, B. n., Rajpurkar, P. n., Wang, A. n., Gao, R. n., Jones, E. n., Yu, Y. n., Langlotz, C. P., Ball, R. L., Montine, T. J., Martin, B. A., Berry, G. J., Ozawa, et al  
2020; 3 (1): 23
- **Prospective Deployment of Deep Learning in MRI: A Framework for Important Considerations, Challenges, and Recommendations for Best Practices.** *Journal of magnetic resonance imaging : JMIR*  
Chaudhari, A. S., Sandino, C. M., Cole, E. K., Larson, D. B., Gold, G. E., Vasanawala, S. S., Lungren, M. P., Hargreaves, B. A., Langlotz, C. P.  
2020
- **Regulatory Frameworks for Development and Evaluation of Artificial Intelligence-Based Diagnostic Imaging Algorithms: Summary and Recommendations.** *Journal of the American College of Radiology : JACR*  
Larson, D. B., Harvey, H. n., Rubin, D. L., Irani, N. n., Tse, J. R., Langlotz, C. P.  
2020
- **Improving Cancer Diagnosis and Care: Patient Access to Oncologic Imaging Expertise** *JOURNAL OF CLINICAL ONCOLOGY*  
Nass, S. J., Cogle, C. R., Brink, J. A., Langlotz, C. P., Balogh, E. P., Muellner, A., Siegal, D., Schilsky, R. L., Hricak, H.  
2019; 37 (20): 1690+
- **Comparative effectiveness of convolutional neural network (CNN) and recurrent neural network (RNN) architectures for radiology text report classification** *ARTIFICIAL INTELLIGENCE IN MEDICINE*  
Banerjee, I., Ling, Y., Chen, M. C., Hasan, S. A., Langlotz, C. P., Moradzadeh, N., Chapman, B., Amrhein, T., Mong, D., Rubin, D. L., Farri, O., Lungren, M. P.  
2019; 97: 79–88
- **Cross-type biomedical named entity recognition with deep multi-task learning** *BIOINFORMATICS*  
Wang, X., Zhang, Y., Ren, X., Zhang, Y., Zitnik, M., Shang, J., Langlotz, C., Han, J.  
2019; 35 (10): 1745–52
- **Effect of Clinical Decision Support-Generated Report Cards Versus Real-Time Alerts on Primary Care Provider Guideline Adherence for Low Back Pain Outpatient Lumbar Spine MRI Orders** *AMERICAN JOURNAL OF ROENTGENOLOGY*  
Zafart, H. M., Ip, I. K., Mills, A. M., Raja, A. S., Langlotz, C. P., Khorasani, R.  
2019; 212 (2): 386–94
- **Human-machine partnership with artificial intelligence for chest radiograph diagnosis.** *NPJ digital medicine*  
Patel, B. N., Rosenberg, L. n., Willcox, G. n., Baltaxe, D. n., Lyons, M. n., Irvin, J. n., Rajpurkar, P. n., Amrhein, T. n., Gupta, R. n., Halabi, S. n., Langlotz, C. n., Lo, E. n., Mammarrappallil, et al  
2019; 2: 111
- **Fostering a Healthy AI Ecosystem for Radiology: Conclusions of the 2018 RSNA Summit on AI in Radiology.** *Radiology. Artificial intelligence*  
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