Stanford

Jianghong Rao

Professor of Radiology (Molecular Imaging Program at Stanford) and, by courtesy, of Chemistry

Radiology - Rad/Molecular Imaging Program at Stanford

NIH Biosketch available Online

CONTACT INFORMATION

- **Alternate Contact**

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Bio

ACADEMIC APPOINTMENTS

- Professor, Radiology - Rad/Molecular Imaging Program at Stanford
- Professor (By courtesy), Chemistry
- Member, Bio-X
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute

HONORS AND AWARDS

- Human Frontier Science Program Young Investigator, Human Frontier Science Program (2007-2010)
- Career Award at the Scientific Interface, Burroughs Wellcome (2002-2007)
- Merck Fellow, Damon Runyon Cancer Research Fund (1999-2001)

PROFESSIONAL EDUCATION

- Ph.D., Harvard University , Chemistry (1999)

LINKS

- http://raolab.stanford.edu: http://raolab.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Probe chemistry and nanotechnology for molecular imaging and diagnostics

CLINICAL TRIALS

- Biodistribution&Pharmacokinetic of Position Emission Tomography(PET) Radiopharmaceutical 18F C SNAT4, Not Recruiting

Teaching

COURSES

2023-24

- Seeing the Invisible: CHEM 23N, RAD 23N (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Sheng-Yao Dai, Qunfeng Fu, Irene Lim, Kimberly Trevino, Ting Wang, Zhen Xiao, Charles Yen, Jiyao Yu

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biophysics (Phd Program)
- Cancer Biology (Phd Program)

Publications

PUBLICATIONS

- **Multiparameter Longitudinal Imaging of Immune Cell Activity in Chimeric Antigen Receptor T Cell and Checkpoint Blockade Therapies.** *ACS central science*
  Xie, J., El Rami, F., Zhou, K., Simonetta, F., Chen, Z., Zheng, X., Chen, M., Balakrishnan, P. B., Dai, S., Murty, S., Alam, I. S., Baker, J., Negrin, et al
  2022; 8 (5): 590-602

- **Mitochondrial copper depletion suppresses triple-negative breast cancer in mice.** *Nature biotechnology*
  Cui, L., Gouw, A. M., LaGory, E. L., Guo, S., Attarwala, N., Tang, Y., Qi, J., Chen, Y., Gao, Z., Casey, K. M., Bazhin, A. A., Chen, M., Hu, et al
  2020

- **Carbon-coated FeCo nanoparticles as sensitive magnetic-particle-imaging tracers with photothermal and magnetothermal properties.** *Nature biomedical engineering*
  Song, G. n., Kenney, M. n., Chen, Y. S., Zheng, X. n., Deng, Y. n., Chen, Z. n., Wang, S. X., Gambhir, S. S., Dai, H. n., Rao, J. n.
  2020

- **A Fluorogenic Trehalose Probe for Tracking Phagocytosed Mycobacterium tuberculosis.** *Journal of the American Chemical Society*
  Dai, T. n., Xie, J. n., Zhu, Q. n., Kamariza, M. n., Jiang, K. n., Bertozzi, C. R., Rao, J. n.
  2020

- **Pre-targeted Imaging of Protease Activity Via In Situ Assembly of Nanoparticles.** *Angewandte Chemie (International ed. in English)*
  Rao, J. n., Chen, Z. n., Chen, M. n., Zhou, K. n.
  2020

- **A near-infrared phosphorescent nanoprobe enables quantitative, longitudinal imaging of tumor hypoxia dynamics during radiotherapy.** *Cancer research*
  Zheng, X., Cui, L., Chen, M., Soto, L. A., Graves, E. E., Rao, J.
  2019

- **Rapid and specific labeling of single live Mycobacterium tuberculosis with a dual-targeting fluorogenic probe** *SCIENCE TRANSLATIONAL MEDICINE*
  Cheng, Y., Xie, J., Lee, K., Gaur, R. L., Song, A., Dai, T., Ren, H., Wu, J., Sun, Z., Banaei, N., Akin, D., Rao, J.
  2018; 10 (454)

- **Bioorthogonal cyclization-mediated in situ self-assembly of small-molecule probes for imaging caspase activity in vivo.** *Nature chemistry*
  Ye, D., Shuhendler, A. J., Cui, L., Tong, L., Tee, S. S., Tikhomirov, G., Felsher, D. W., Rao, J.
  2014; 6 (6): 519-526

- **Real-time imaging of oxidative and nitrosative stress in the liver of live animals for drug-toxicity testing.** *Nature biotechnology*
  Shuhendler, A. J., Pu, K., Cui, L., Uetrecht, J. P., Rao, J.
  2014; 32 (4): 373-380

- **Semiconducting polymer nanoparticles as photoacoustic molecular imaging probes in living mice.** *Nature nanotechnology*
  Pu, K., Shuhendler, A. J., Jokerst, J. V., Mei, J., Gambhir, S. S., Bao, Z., Rao, J.
  2014; 9 (3): 233-239

- **A biocompatible condensation reaction for controlled assembly of nanostructures in living cells** *Nature Chemistry*
  Liang G, Ren H, Rao J
  2010; 2 (1): 54-60

- **Culture-Independent Multiplexed Detection of Drug-Resistant Bacteria Using Surface-Enhanced Raman Scattering.** *ACS sensors*
  Dai, T., Xiao, Z., Shan, D., Moreno, A., Li, H., Prakash, M., Banaei, N., Rao, J.
  2023

- **Bioluminogenic Probe for Rapid, Ultrasensitive Detection of #-Lactam-Resistant Bacteria.** *Analytical chemistry*
  Dai, T., Xie, J., Buonomo, J. A., Moreno, A., Banaei, N., Bertozzi, C. R., Rao, J.
  2023

- **A TLR7-nanoparticle adjuvant promotes a broad immune response against heterologous strains of influenza and SARS-CoV-2.** *Nature materials*
  Yin, Q., Luo, W., Mallajosyula, V., Bo, Y., Guo, J., Xie, J., Sun, M., Verma, R., Li, C., Constantz, C. M., Wagar, L. E., Li, J., Sola, et al
  2023

- **Highly Excretable Gold Supraclusters for Translatable In Vivo Raman Imaging of Tumors.** *ACS nano*
  Yu, J. H., Jeong, M. S., Cruz, E. O., Alam, I. S., Tumbale, S. K., Zlitni, A., Lee, S. Y., Park, Y. I., Ferrara, K., Kwon, S., Gambhir, S. S., Rao, J.
  2023

- **Uniform and Length-Tunable, Paramagnetic Self-Assembled Nitroxide-Based Nanofibers for Magnetic Resonance Imaging** *MACROMOLECULES*
  Zhao, C., Chen, Q., Garcia-Hernandez, J., Watanabe, L. K., Rawson, J. M., Rao, J., Manners, I.
  2022

- **Invivo bioluminescence imaging of granzyme B activity in tumor response to cancer immunotherapy.** *Cell chemical biology*
  Chen, M., Zhou, K., Dai, S., Tadepalli, S., Balakrishnan, P. B., Xie, J., Rami, F. E., Dai, T., Cui, L., Idoyaga, J., Rao, J.
  2022

- **Real-time optical oximetry during FLASH radiotherapy using a phosphorescent nanoprobe.** *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*
  Ha, B., Liang, K., Liu, C., Melemenidis, S., Manjappa, R., Viswanathan, V., Das, N., Ashraf, R., Lau, B., Soto, L., Graves, E. E., Rao, J., Loo, et al
  2022

- **Reversibly Photoswitching Upconversion Nanoparticles for Super-sensitive Photoacoustic Molecular Imaging.** *Angewandte Chemie (International ed. in English)*
  Rao, J., Liu, C., Zheng, X., Dai, T., Wang, H., Chen, X., Chen, B., Sun, T., Wang, F., Chu, S.
  2022

- **A dual-caged resorufin probe for rapid screening of infections resistant to lactam antibiotics.** *Chemical science*
  Xie, J., Mu, R., Fang, M., Cheng, Y., Senchyna, F., Moreno, A., Banaei, N., Rao, J.
  2021; 12 (26): 9153-9161

- **Evaluation of a procaspase-3 activator with hydroxyurea or temozolomide against high-grade meningioma in cell culture and canine cancer patients.** *Neuro-oncology*
  Tonogai, E. J., Huang, S., Botham, R. C., Berry, M. R., Joslyn, S. K., Daniel, G. B., Chen, Z., Rao, J., Zhang, X., Basuli, F., Rossmeisl, J. H., Riggins, G. J., LeBlanc, et al
  2021

- **Visualizing the dynamics of tuberculosis pathology using molecular imaging.** *The Journal of clinical investigation*
  Ordonez, A. A., Tucker, E. W., Anderson, C. J., Carter, C. L., Ganatra, S., Kaushal, D., Kramnik, I., Lin, P. L., Madigan, C. A., Mendez, S., Rao, J., Savic, R. M., Tobin, et al
  2021; 131 (5)

- **[18F]-C-SNAT4: an improved caspase-3-sensitive nanoaggregation PET tracer for imaging of tumor responses to chemo- and immunotherapies.** *European journal of nuclear medicine and molecular imaging*
  Chen, M. n., Chen, Z. n., Castillo, J. B., Cui, L. n., Zhou, K. n., Shen, B. n., Xie, J. n., Chin, F. T., Rao, J. n.

2021

- **Engineering of magnetic nanoparticles as magnetic particle imaging tracers.** *Chemical Society reviews*
  Lu, C., Han, L., Wang, J., Wan, J., Song, G., Rao, J.
  2021
- **A dual-caged resorufin probe for rapid screening of infections resistant to lactam antibiotics** *Chemical Science*
  Xie, J., Mu, R., Fang, M., Cheng, Y., Senchyna, F., Moreno, A., Banaei, N., Rao, J.
  2021
- **In vivo imaging of methionine aminopeptidase II for prostate cancer risk stratification.** *Cancer research*
  Xie, J. n., Rice, M. A., Chen, Z. n., Cheng, Y. n., Hsu, E. C., Chen, M. n., Song, G. n., Cui, L. n., Zhou, K. n., Castillo, J. B., Zhang, C. A., Shen, B. n., Chin, et al
  2021
- **Engineered algae: A novel oxygen-generating system for effective treatment of hypoxic cancer.** *Science advances*
  Qiao, Y., Yang, F., Xie, T., Du, Z., Zhong, D., Qi, Y., Li, Y., Li, W., Lu, Z., Rao, J., Sun, Y., Zhou, M.
  2020; 6 (21): eaba5996
- **Engineered algae: A novel oxygen-generating system for effective treatment of hypoxic cancer.** *Science advances*
  Qiao, Y., Yang, F., Xie, T., Du, Z., Zhong, D., Qi, Y., Li, Y., Li, W., Lu, Z., Rao, J., Sun, Y., Zhou, M.
  2020; 6 (21)
- **Imaging of tumour acidosis with PET.** *Nature biomedical engineering*
  Rao, J.
  2020; 4 (3): 250–51
- **Different PEG-PLGA Matrices Influence In Vivo Optical/Photoacoustic Imaging Performance and Biodistribution of NIR-Emitting #-Conjugated Polymer Contrast Agents.** *Advanced healthcare materials*
  Neumann, P. R., Erdmann, F. n., Holthof, J. n., Hädrich, G. n., Green, M. n., Rao, J. n., Dailey, L. A.
  2020: e2001089
- **Reduction Triggered In Situ Polymerization in Living Mice.** *Journal of the American Chemical Society*
  Cui, L. n., Vivona, S. n., Smith, B. R., Kothapalli, S. R., Liu, J. n., Ma, X. n., Chen, Z. n., Taylor, M. n., Kierstead, P. H., Fréchet, J. M., Gambhir, S. S., Rao, J. n.
  2020
- **In Vivo Optical Performance of a New Class of Near-Infrared-Emitting Conjugated Polymers: Borylated PF8-BT.** *ACS applied materials & interfaces*
  Neumann, P. R., Crossley, D. L., Turner, M., Ingleson, M., Green, M., Rao, J., Dailey, L. A.
  2019
- **Targeting MMP-14 for dual PET and fluorescence imaging of glioma in preclinical models.** *European journal of nuclear medicine and molecular imaging*
  Kasten, B. B., Jiang, K., Cole, D., Jani, A., Udayakumar, N., Gillespie, G. Y., Lu, G., Dai, T., Rosenthal, E. L., Markert, J. M., Rao, J., Warram, J. M.
  2019
- **Nanoparticle probes for multimodality molecular imaging in living subjects**
  Rao, J.
  AMER CHEMICAL SOC.2019
- **Fluorescent probes for imaging enzyme activity**
  Rao, J.
  AMER CHEMICAL SOC.2019
- **A Magneto-Optical Nanoplatform for Multimodality Imaging of Tumors in Mice.** *ACS nano*
  Song, G., Zheng, X., Wang, Y., Xia, X., Chu, S., Rao, J.
  2019
- **MMP-14 as a noninvasive marker for PET and NIRF imaging of glioblastoma multiforme**
  Houson, H., Kasten, B., Jiang, K., Rao, J., Warram, J.
  SOC NUCLEAR MEDICINE INC.2019
- **Magnetic Particle Imaging in Neurosurgery** *WORLD NEUROSURGERY*
  Meola, A., Rao, J., Chaudhary, N., Song, G., Zheng, X., Chang, S. D.

2019; 125: 261–70

- **Synthesis and evaluation of [F-18]SuPAR for PET Imaging of DNA damage-dependent PARP activity**
  Shuhendler, A. J., Shen, B., Cui, L., Chen, Z., Rao, J., Chin, F. T.
  WILEY.2019: S502–S504

- **Bright sub-20-nm cathodoluminescent nanoprobes for electron microscopy** *NATURE NANOTECHNOLOGY*
  Prigozhin, M. B., Maurer, P. C., Courtis, A. M., Liu, N., Wisser, M. D., Siefe, C., Tian, B., Chan, E., Song, G., Fischer, S., Aloni, S., Ogletree, D., Barnard, et al
  2019; 14 (5): 420-+

- **[F-18]-SuPAR: A Radiofluorinated Probe for Noninvasive Imaging of DNA Damage-Dependent Poly(ADP-ribose) Polymerase Activity** *BIOCONJUGATE CHEMISTRY*
  Shuhendler, A. J., Cui, L., Chen, Z., Shen, B., Chen, M., James, M. L., Witney, T. H., Bazalova-Carter, M., Gambhir, S. S., Chin, F. T., Graves, E. E., Rao, J.
  2019; 30 (5): 1331–42

- **"Magnetic Particle Imaging (MPI) in Neurosurgery".** *World neurosurgery*
  Meola, A., Rao, J., Chaudhary, N., Song, G., Zheng, X., Chang, S. D.
  2019

- **Theranostic nanoparticles enhance the response of glioblastomas to radiation** *Nanotheranostics*
  Wu, W., Klockow, J. L., Mohanty, S., Ku, K. S., Daldrup-Link, H. E.
  2019; 3(4) (299-310)

- **Exploring condensation reaction between aromatic nitriles and amnio thiols to form nanoparticles in cells for imaging the activity of protease and glycosidase.** *Angewandte Chemie (International ed. in English)*
  Rao, J. n., Chen, Z. n., Chen, M. n., Cheng, Y. n., Kowada, T. n., Xie, J. n., Zheng, X. n.
  2019

- **Methionine aminopeptidase II (MetAP2) activated in situ self-assembly of small-molecule probes for imaging prostate cancer.**
  Xie, J., Rice, M., Cheng, Y., Song, G., Kunder, C., Brooks, J. D., Stoyanova, T., Rao, J.
  AMER ASSOC CANCER RESEARCH.2018: 115–16

- **Editorial Overview: Non-invasive molecular imaging: dedicated to the memory of Professor Roger Tsien** *CURRENT OPINION IN CHEMICAL BIOLOGY*
  Adams, S., Rao, J.
  2018; 45: IV-VI

- **A novel theranostic strategy for MMP-14 expressing glioblastomas impacts survival**
  Mohanty, S., Chen, Z., Li, K., Morais, G., Klockow, J., Yerneni, K., Pisani, L., Chin, F., Mitra, S., Cheshier, S., Chang, E., Gambhir, S., Rao, et al
  AMER ASSOC CANCER RESEARCH.2018

- **Gold Nanoparticles for Brain tumor imaging: a Systematic Review** *FRONTIERS IN NEUROLOGY*
  Meola, A., Rao, J., Chaudhary, N., Sharma, M., Chang, S. D.
  2018; 9: 328

- **Recent progress on semiconducting polymer nanoparticles for molecular imaging and cancer phototherapy** *BIOMATERIALS*
  Li, J., Rao, J., Pu, K.
  2018; 155: 217–35

- **Positron Emission Tomography Imaging of Tumor Apoptosis with a Caspase-Sensitive Nano-Aggregation Tracer [18F]C-SNAT.** *Methods in molecular biology (Clifton, N.J.)*
  Chen, Z., Rao, J.
  2018; 1790: 181–95

- **Janus Iron Oxides @ Semiconducting Polymer Nanoparticle Tracer for Cell Tracking by Magnetic Particle Imaging** *NANO LETTERS*
  Song, G., Chen, M., Zhang, Y., Cui, L., Qu, H., Zheng, X., Wintermark, M., Liu, Z., Rao, J.
  2018; 18 (1): 182–89

- **Nanotechnology Strategies To Advance Outcomes in Clinical Cancer Care** *ACS NANO*
  Hartshorn, C. M., Bradbury, M. S., Lanza, G. M., Nel, A. E., Rao, J., Wang, A. Z., Wiesner, U. B., Yang, L., Grodzinski, P.
  2018; 12 (1): 24–43

- **Intramolecular substitution uncages fluorogenic probes for detection of metallo-carbapenemase-expressing bacteria.** *Chemical science*
  Song, A., Cheng, Y., Xie, J., Banaei, N., Rao, J.
  2017; 8 (11): 7669-7674

- **A Tumor-Specific Cascade Amplification Drug Release Nanoparticle for Overcoming Multidrug Resistance in Cancers** *ADVANCED MATERIALS*
  Ye, M., Han, Y., Tang, J., Piao, Y., Liu, X., Zhou, Z., Gao, J., Rao, J., Shen, Y.
  2017; 29 (38)

- **Intravital excitation increases detection sensitivity for pulmonary tuberculosis by whole-body imaging with -lactamase reporter enzyme fluorescence** *JOURNAL OF BIOPHOTONICS*
  Nooshabadi, F., Yang, H., Cheng, Y., Durkee, M. S., Xie, H., Rao, J., Cirillo, J. D., Maitland, K. C.
  2017; 10 (6-7): 821–29

- **Semiconducting polymer nanoparticles as photoacoustic molecular imaging probes** *WILEY INTERDISCIPLINARY REVIEWS-NANOMEDICINE AND NANOBIOTECHNOLOGY*
  Cui, L., Rao, J.
  2017; 9 (2)

- **Real-time Imaging of Mycobacterium tuberculosis, Using a Novel Near-Infrared Fluorescent Substrate** *JOURNAL OF INFECTIOUS DISEASES*
  Yang, H., Kong, Y., Cheng, Y., Janagama, H., Hassounah, H., Xie, H., Rao, J., Cirillo, J. D.
  2017; 215 (3): 405-414

- **[F-18]GE-180 PET Detects Reduced Microglia Activation After LM11A-31 Therapy in a Mouse Model of Alzheimer's Disease** *THERANOSTICS*
  James, M. L., Belichenko, N. P., Shuhendler, A. J., Hoehne, A., Andrews, L. E., Condon, C., Nguyen, T. V., Reiser, V., Jones, P., Trigg, W., Rao, J., Gambhir, S. S., Longo, et al
  2017; 7 (6): 1422-1436

- **A novel theranostic strategy for MMP-14 expressing glioblastomas impacts survival.** *Molecular cancer therapeutics*
  Mohanty, S. n., Chen, Z. n., Li, K. n., Morais, G. R., Klockow, J. n., Yerneni, K. n., Pisani, L. n., Chin, F. T., Mitra, S. n., Cheshier, S. n., Chang, E. n., Gambhir, S. S., Rao, et al
  2017

- **Intramolecular substitution uncages fluorogenic probes for detection of metallo-carbapenemase-expressing bacteria** *Chemical Science*
  Song, A., Cheng, Y., Xie, J., Banaei, N., Rao, J.
  2017; 8 (11): 7669-7674

- **Recent advances of semiconducting polymer nanoparticles in in vivo molecular imaging** *JOURNAL OF CONTROLLED RELEASE*
  Pu, K., Chattopadhyay, N., Rao, J.
  2016; 240: 312-322

- **Semiconducting polymer nanoparticles as photoacoustic molecular imaging probes.** *Wiley interdisciplinary reviews. Nanomedicine and nanobiotechnology*
  Cui, L., Rao, J.
  2016

- **Point-of-Care Detection of beta-Lactamase in Milk with a Universal Fluorogenic Probe** *ANALYTICAL CHEMISTRY*
  Chen, Y., Xianyu, Y., Wu, J., Zheng, W., Rao, J., Jiang, X.
  2016; 88 (11): 5605-5609

- **PET imaging of tumor glycolysis downstream of hexokinase through noninvasive measurement of pyruvate kinase M2.** *Science translational medicine*
  Witney, T. H., James, M. L., Shen, B., Chang, E., Pohling, C., Arksey, N., Hoehne, A., Shuhendler, A., Park, J., Bodapati, D., Weber, J., Gowrishankar, G., Rao, et al
  2015; 7 (310): 310ra169-?

- **Molecular Magnetic Resonance Imaging of Tumor Response to Therapy** *SCIENTIFIC REPORTS*
  Shuhendler, A. J., Ye, D., Brewer, K. D., Bazalova-Carter, M., Lee, K., Kempen, P., Wittrup, K. D., Graves, E. E., Rutt, B., Rao, J.
  2015; 5

- **Semiconducting Polymer Nanoparticles with Persistent Near-Infrared Luminescence for In Vivo Optical Imaging.** *Angewandte Chemie (International ed. in English)*
  Palner, M., Pu, K., Shao, S., Rao, J.

2015; 54 (39): 11477-11480

- **A Systematic Comparison of 18F-C-SNAT to Established Radiotracer Imaging Agents for the Detection of Tumor Response to Treatment.** *Clinical cancer research*
  Witney, T. H., Hoehne, A., Reeves, R. E., Ilovich, O., Namavari, M., Shen, B., Chin, F. T., Rao, J., Gambhir, S. S.
  2015; 21 (17): 3896-3905
- **Diketopyrrolopyrrole-Based Semiconducting Polymer Nanoparticles for In Vivo Photoacoustic Imaging.** *Advanced materials*
  Pu, K., Mei, J., Jokerst, J. V., Hong, G., Antaris, A. L., Chattopadhyay, N., Shuhendler, A. J., Kurosawa, T., Zhou, Y., Gambhir, S. S., Bao, Z., Rao, J.
  2015; 27 (35): 5184-5190
- **Preclinical Kinetic Analysis of the Caspase-3/7 PET Tracer 18F-C-SNAT: Quantifying the Changes in Blood Flow and Tumor Retention After Chemotherapy.** *Journal of nuclear medicine : official publication, Society of Nuclear Medicine*
  Palner, M., Shen, B., Jeon, J., Lin, J., Chin, F. T., Rao, J.
  2015; 56 (9): 1415-1421
- **Quantitative detection of cells expressing BlaC using droplet-based microfluidics for use in the diagnosis of tuberculosis.** *Biomicrofluidics*
  Lyu, F., Xu, M., Cheng, Y., Xie, J., Rao, J., Tang, S. K.
  2015; 9 (4): 044120-?
- **Ultrasound-guided delivery of microRNA loaded nanoparticles into cancer** *JOURNAL OF CONTROLLED RELEASE*
  Wang, T., Choe, J. W., Pu, K., Devulapally, R., Bachawal, S., Machtaler, S., Chowdhury, S. M., Luong, R., Tian, L., Khuri-Yakub, B., Rao, J., Paulmurugan, R., Willmann, et al
  2015; 203: 99-108
- **Magnetic resonance imaging of stem cell apoptosis in arthritic joints with a caspase activatable contrast agent.** *ACS nano*
  Nejadnik, H., Ye, D., Lenkov, O. D., Donig, J. S., Martin, J. E., Castillo, R., Derugin, N., Sennino, B., Rao, J., Daldrup-Link, H.
  2015; 9 (2): 1150-1160
- **2-Cyanobenzothiazole (CBT) Condensation for Site-Specific Labeling of Proteins at the Terminal Cysteine Residues.** *Methods in molecular biology (Clifton, N.J.)*
  Cui, L., Rao, J.
  2015; 1266: 81-92
- **Comparison of two site-specifically (18)F-labeled affibodies for PET imaging of EGFR positive tumors.** *Molecular pharmaceutics*
  Su, X., Cheng, K., Jeon, J., Shen, B., Venturin, G. T., Hu, X., Rao, J., Chin, F. T., Wu, H., Cheng, Z.
  2014; 11 (11): 3947-3956
- **Caspase-responsive smart gadolinium-based contrast agent for magnetic resonance imaging of drug-induced apoptosis.** *Chemical science*
  Ye, D., Shuhendler, A. J., Pandit, P., Brewer, K. D., Tee, S. S., Cui, L., Tikhomirov, G., Rutt, B., Rao, J.
  2014; 4 (10): 3845-3852
- **Fluorogenic Probes with Substitutions at the 2 and 7 Positions of Cephalosporin are Highly BlaC-Specific for Rapid Mycobacterium tuberculosis Detection** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Cheng, Y., Xie, H., Sule, P., Hassounah, H., Graviss, E. A., Kong, Y., Cirillo, J. D., Rao, J.
  2014; 53 (35): 9360-9364
- **Redox-triggered self-assembly of gadolinium-based MRI probes for sensing reducing environment.** *Bioconjugate chemistry*
  Ye, D., Pandit, P., Kempen, P., Lin, J., Xiong, L., Sinclair, R., Rutt, B., Rao, J.
  2014; 25 (8): 1526-1536
- **Phosphorylcholine-coated semiconducting polymer nanoparticles as rapid and efficient labeling agents for in vivo cell tracking.** *Advanced healthcare materials*
  Pu, K., Shuhendler, A. J., Valta, M. P., Cui, L., Saar, M., Peehl, D. M., Rao, J.
  2014; 3 (8): 1292-1298
- **Redox-Triggered Self-Assembly of Gadolinium-Based MRI Probes for Sensing Reducing Environment** *BIOCONJUGATE CHEMISTRY*
  Ye, D., Pandit, P., Kempen, P., Lin, J., Xiong, L., Sinclair, R., Rutt, B., Rao, J.
  2014; 25 (8): 1526-1536
- **Engineering the stereochemistry of cephalosporin for specific detection of pathogenic carbapenemase-expressing bacteria.** *Angewandte Chemie (International ed. in English)*

Shi, H., Cheng, Y., Lee, K. H., Luo, R. F., Banaei, N., Rao, J.
2014; 53 (31): 8113-8116

- **Development of novel tumor-targeted theranostic nanoparticles activated by membrane-type matrix metalloproteinases for combined cancer magnetic resonance imaging and therapy.** *Small*
  Ansari, C., Tikhomirov, G. A., Hong, S. H., Falconer, R. A., Loadman, P. M., Gill, J. H., Castaneda, R., Hazard, F. K., Tong, L., Lenkov, O. D., Felsher, D. W., Rao, J., Daldrup-Link, et al
  2014; 10 (3): 566-?

- **Cancer therapy: development of novel tumor-targeted theranostic nanoparticles activated by membrane-type matrix metalloproteinases for combined cancer magnetic resonance imaging and therapy (small 3/2014).** *Small*
  Ansari, C., Tikhomirov, G. A., Hong, S. H., Falconer, R. A., Loadman, P. M., Gill, J. H., Castaneda, R., Hazard, F. K., Tong, L., Lenkov, O. D., Felsher, D. W., Rao, J., Daldrup-Link, et al
  2014; 10 (3): 417-?

- **Development of novel tumor-targeted theranostic nanoparticles activated by membrane-type matrix metalloproteinases for combined cancer magnetic resonance imaging and therapy.** *Small*
  Ansari, C., Tikhomirov, G. A., Hong, S. H., Falconer, R. A., Loadman, P. M., Gill, J. H., Castaneda, R., Hazard, F. K., Tong, L., Lenkov, O. D., Felsher, D. W., Rao, J., Daldrup-Link, et al
  2014; 10 (3): 566-575

- **Caspase-responsive smart gadolinium-based contrast agent for magnetic resonance imaging of drug-induced apoptosis** *CHEMICAL SCIENCE*
  Ye, D., Shuhendler, A. J., Pandit, P., Brewer, K. D., Tee, S. S., Cui, L., Tikhomirov, G., Rutt, B., Rao, J.
  2014; 5 (10): 3845-3852

- **Iron Administration before Stem Cell Harvest Enables MR Imaging Tracking after Transplantation.** *Radiology*
  Khurana, A., Chapelin, F., Beck, G., Lenkov, O. D., Donig, J., Nejadnik, H., Messing, S., Derugin, N., Chan, R. C., Gaur, A., Sennino, B., McDonald, D. M., Kempen, et al
  2013; 269 (1): 186-197

- **Nanoparticles for cancer imaging: The good, the bad, and the promise.** *Nano today*
  Chapman, S., Dobrovolskaia, M., Farahani, K., Goodwin, A., Joshi, A., Lee, H., Meade, T., Pomper, M., Ptak, K., Rao, J., Singh, R., Sridhar, S., Stern, et al
  2013; 8 (5): 454-460

- **Nanoparticles for cancer imaging: The good, the bad, and the promise** *NANO TODAY*
  Chapman, S., Dobrovolskai, M., Farahani, K., Goodwin, A., Joshi, A., Lee, H., Meade, T., Pomper, M., Ptak, K., Rao, J., Singh, R., Sridhar, S., Stern, et al
  2013; 8 (5): 454-460

- **Positron emission tomography imaging of drug-induced tumor apoptosis with a caspase-triggered nanoaggregation probe.** *Angewandte Chemie (International ed. in English)*
  Shen, B., Jeon, J., Palner, M., Ye, D., Shuhendler, A., Chin, F. T., Rao, J.
  2013; 52 (40): 10511-10514

- **Semiconducting polymer nanoprobe for in vivo imaging of reactive oxygen and nitrogen species.** *Angewandte Chemie (International ed. in English)*
  Pu, K., Shuhendler, A. J., Rao, J.
  2013; 52 (39): 10325-10329

- **Activatable oligomerizable imaging agents for photoacoustic imaging of furin-like activity in living subjects.** *Journal of the American Chemical Society*
  Dragulescu-Andrasi, A., Kothapalli, S., Tikhomirov, G. A., Rao, J., Gambhir, S. S.
  2013; 135 (30): 11015-11022

- **Synthesis and initial evaluation of [F-18]CAIP for PET imaging of caspase-3 activity in apoptosis**
  Jeon Jongho, J. H., Shen Bin, B., Palner, M., Ye Deju, D. J., Chin, F. T., Rao, J.
  WILEY-BLACKWELL.2013: S375–S375

- **[F-18]CAIP: a novel PET tracer for imaging caspase-3-initiated apoptosis in treated tumors** *AACR/SNMMI Joint Conference on State-of-the-Art Molecular Imaging in Cancer Biology and Therapy*
  Palner, M., Shen, B., Jeon, J., Ye, D., Shuhendler, A., Chin, F. T., Rao, J.
  SOC NUCLEAR MEDICINE INC.2013: 20–20

- **Synthesis of ligand-functionalized water-soluble [F-18]YF3 nanoparticles for PET imaging** *NANOSCALE*

Xiong, L., Shen, B., Behera, D., Gambhir, S. S., Chin, F. T., Rao, J.
2013; 5 (8): 3253-3256

- **Enzymatic activation of nitro-aryl fluorogens in live bacterial cells for enzymatic turnover-activated localization microscopy** *CHEMICAL SCIENCE*
  Lee, M. K., Williams, J., Twieg, R. J., Rao, J., Moerner, W. E.
  2013; 4 (1): 220-225

- **Self-luminescing BRET-FRET near-infrared dots for in vivo lymph-node mapping and tumour imaging** *NATURE COMMUNICATIONS*
  Xiong, L., Shuhendler, A. J., Rao, J.
  2012; 3

- **Rapid point-of-care detection of the tuberculosis pathogen using a BlaC-specific fluorogenic probe** *NATURE CHEMISTRY*
  Xie, H., Mire, J., Kong, Y., Chang, M., Hassounah, H. A., Thornton, C. N., Sacchettini, J. C., Cirillo, J. D., Rao, J.
  2012; 4 (10): 802-809

- **Efficient Method for Site-Specific F-18-Labeling of Biomolecules Using the Rapid Condensation Reaction between 2-Cyanobenzothiazole and Cysteine** *BIOCONJUGATE CHEMISTRY*
  Jeon, J., Shen, B., Xiong, L., Miao, Z., Lee, K. H., Rao, J., Chin, F. T.
  2012; 23 (9): 1902-1908

- **Enzymatic Activation of Nitro-Aryl Fluorogens in Live Cells for Turnover Activated Localization Microscopy** *26th Annual Symposium of the Protein-Society*
  Lee, M., Williams, J., Twieg, R., Rao, J., Moerner, W.
  WILEY-BLACKWELL.2012: 127–127

- **A strategy to enhance the binding affinity of fluorophore-aptamer pairs for RNA tagging with neomycin conjugation** *CHEMICAL COMMUNICATIONS*
  Jeon, J., Leez, K. H., Rao, J.
  2012; 48 (80): 10034-10036

- **A Selenium Analogue of Firefly D-Luciferin with Red-Shifted Bioluminescence Emission** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Conley, N. R., Dragulescu-Andrasi, A., Rao, J., Moerner, W. E.
  2012; 51 (14): 3350-3353

- **Immobilizing Reporters for Molecular Imaging of the Extracellular Microenvironment in Living Animals** *ACS CHEMICAL BIOLOGY*
  Xia, Z., Xing, Y., Jeon, J., Kim, Y., Gall, J., Dragulescu-Andrasi, A., Gambhir, S. S., Rao, J.
  2011; 6 (10): 1117-1126

- **MRI of Tumor-Associated Macrophages with Clinically Applicable Iron Oxide Nanoparticles** *CLINICAL CANCER RESEARCH*
  Daldrup-Link, H. E., Golovko, D., Ruffell, B., DeNardo, D. G., Castaneda, R., Ansari, C., Rao, J., Tikhomirov, G. A., Wendland, M. F., Corot, C., Coussens, L. M.
  2011; 17 (17): 5695-5704

- **Real-Time Imaging of Rab5 Activity Using a Prequenched Biosensor** *ACS CHEMICAL BIOLOGY*
  Zhan, K., Xie, H., Gall, J., Ma, M., Griesbeck, O., Salehi, A., Rao, J.
  2011; 6 (7): 692-699

- **Whole-body imaging of infection using fluorescence.** *Current protocols in microbiology*
  Kong, Y., Akin, A. R., Francis, K. P., Zhang, N., Troy, T. L., Xie, H., Rao, J., Cirillo, S. L., Cirillo, J. D.
  2011; Chapter 2: Unit 2C 3-?

- **Whole-body imaging of infection using bioluminescence.** *Current protocols in microbiology*
  Kong, Y., Shi, Y., Chang, M., Akin, A. R., Francis, K. P., Zhang, N., Troy, T. L., Yao, H., Rao, J., Cirillo, S. L., Cirillo, J. D.
  2011; Chapter 2: Unit 2C 4-?

- **Controlling Intracellular Macrocyclization for the Imaging of Protease Activity** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Ye, D., Liang, G., Ma, M. L., Rao, J.
  2011; 50 (10): 2275-2279

- **F-18-Cyanobenzolthiol ([F-18]CBT): A novel F-18-prosthetic group for labeling peptide or protein**
  Shen Bin, B., Jeon, J., Gambhir, S. S., Rao, J., Chin, F. T.
  WILEY-BLACKWELL.2011: S503–S503

- **Controlled Self-Assembling of Gadolinium Nanoparticles as Smart Molecular Magnetic Resonance Imaging Contrast Agents** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Liang, G., Ronald, J., Chen, Y., Ye, D., Pandit, P., Ma, M. L., Rutt, B., Rao, J.
  2011; 50 (28): 6283-6286
- **Strategies for in vivo imaging of enzyme activity: an overview and recent advances** *CHEMICAL SOCIETY REVIEWS*
  Razgulin, A., Ma, N., Rao, J.
  2011; 40 (7): 4186-4216
- **Superresolution Imaging of Targeted Proteins in Fixed and Living Cells Using Photoactivatable Organic Fluorophores** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Lee, H. D., Lord, S. J., Iwanaga, S., Zhan, K., Xie, H., Williams, J. C., Wang, H., Bowman, G. R., Goley, E. D., Shapiro, L., Twieg, R. J., Rao, J., Moerner, et al
  2010; 132 (43): 15099-15101
- **Combining SELEX Screening and Rational Design to Develop Light-Up Fluorophore-RNA Aptamer Pairs for RNA Tagging** *ACS CHEMICAL BIOLOGY*
  Lee, J., Lee, K. H., Jeon, J., Dragulescu-Andrasi, A., Xiao, F., Rao, J.
  2010; 5 (11): 1065-1074
- **Facile Synthesis, Silanization, and Biodistribution of Biocompatible Quantum Dots** *SMALL*
  Ma, N., Marshall, A. F., Gambhir, S. S., Rao, J.
  2010; 6 (14): 1520-1528
- **Imaging tuberculosis with endogenous beta-lactamase reporter enzyme fluorescence in live mice** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Kong, Y., Yao, H., Ren, H., Subbian, S., Cirillo, S. L., Sacchettini, J. C., Rao, J., Cirillo, J. D.
  2010; 107 (27): 12239-12244
- **Near-Infrared Light Emitting Luciferase via Biomineralization** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Ma, N., Marshall, A. F., Rao, J.
  2010; 132 (20): 6884-?
- **Bioluminescent nanosensors for protease detection based upon gold nanoparticle-luciferase conjugates** *CHEMICAL COMMUNICATIONS*
  Kim, Y., Daniel, W. L., Xia, Z., Xie, H., Mirkin, C. A., Rao, J.
  2010; 46 (1): 76-78
- **In Vivo Bioluminescence Imaging of Furin Activity in Breast Cancer Cells Using Bioluminogenic Substrates** *BIOCONJUGATE CHEMISTRY*
  Dragulescu-Andrasi, A., Liang, G., Rao, J.
  2009; 20 (8): 1660-1666
- **Semiconductor Quantum Dots for Biosensing and In Vivo Imaging** *IEEE TRANSACTIONS ON NANOBIOSCIENCE*
  Xing, Y., Xia, Z., Rao, J.
  2009; 8 (1): 4-12
- **Biosensing and imaging based on bioluminescence resonance energy transfer** *CURRENT OPINION IN BIOTECHNOLOGY*
  Xia, Z., Rao, J.
  2009; 20 (1): 37-44
- **CNOB/ChrR6, a new prodrug enzyme cancer chemotherapy** *MOLECULAR CANCER THERAPEUTICS*
  Thorne, S. H., Barak, Y., Liang, W., Bachmann, M. H., Rao, J., Contag, C. H., Matin, A.
  2009; 8 (2): 333-341
- **Particle Size, Surface Coating, and PEGylation Influence the Biodistribution of Quantum Dots in Living Mice** *SMALL*
  Schipper, M. L., Iyer, G., Koh, A. L., Cheng, Z., Ebenstein, Y., Aharoni, A., Keren, S., Bentolila, L. A., Li, J., Rao, J., Chen, X., Banin, U., Wu, et al
  2009; 5 (1): 126-134
- **A Biocompatible Condensation Reaction for the Labeling of Terminal Cysteine Residues on Proteins** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Ren, H., Xiao, F., Zhan, K., Kim, Y., Xie, H., Xia, Z., Rao, J.
  2009; 48 (51): 9658-9662
- **Imaging Target mRNA and siRNA-Mediated Gene Silencing In Vivo with Ribozyme-Based Reporters** *CHEMBIOCHEM*

So, M., Gowrishankar, G., Hasegawa, S., Chung, J., Rao, J.
2008; 9 (16): 2682-2691

- **Shedding Light on Tumors Using Nanoparticles** *ACS NANO*
  Rao, J.
  2008; 2 (10): 1984-1986
- **HaloTag protein-mediated specific labeling of living cells with quantum dots** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  So, M., Yao, H., Rao, J.
  2008; 374 (3): 419-423
- **Improved QD-BRET conjugates for detection and imaging** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Xing, Y., So, M., Koh, A. L., Sinclair, R., Rao, J.
  2008; 372 (3): 388-394
- **Quantum dot bioconjugates for in vitro diagnostics & in vivo imaging** *CANCER BIOMARKERS*
  Xing, Y., Rao, J.
  2008; 4 (6): 307-319
- **Quantum dot imaging for embryonic stem cells** *BMC BIOTECHNOLOGY*
  Lin, S., Xie, X., Patel, M. R., Yang, Y., Li, Z., Cao, F., Gheysens, O., Zhang, Y., Gambhir, S. S., Rao, J. H., Wu, J. C.
  2007; 7
- **MicroPET-based biodistribution of quantum dots in living mice** *JOURNAL OF NUCLEAR MEDICINE*
  Schipper, M. L., Cheng, Z., Lee, S., Bentolila, L. A., Iyer, G., Rao, J., Chen, X., Wu, A. M., Weiss, S., Gambhir, S. S.
  2007; 48 (9): 1511-1518
- **Chemical labeling of protein in living cells** *CHEMBIOCHEM*
  Dragulescu-Andrasi, A., Rao, J.
  2007; 8 (10): 1099-1101
- **Fluorescence imaging in vivo: recent advances** *CURRENT OPINION IN BIOTECHNOLOGY*
  Rao, J., Dragulescu-Andrasi, A., Yao, H., Yao, H.
  2007; 18 (1): 17-25
- **Visualizing RNA splicing in vivo** *MOLECULAR BIOSYSTEMS*
  Gowrishankar, G., Rao, J.
  2007; 3 (5): 301-307
- **Quantum dot/bioluminescence resonance energy transfer based highly sensitive detection of proteases** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Yao, H., Zhang, Y., Xiao, F., Xia, Z., Rao, J.
  2007; 46 (23): 4346-4349
- **A bioluminogenic substrate for in vivo imaging of beta-lactamase activity** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Yao, H., So, M., Rao, J.
  2007; 46 (37): 7031-7034
- **How molecular imaging is speeding up antiangiogenic drug development** *MOLECULAR CANCER THERAPEUTICS*
  Cai, W., Rao, J., Gambhir, S. S., Chen, X.
  2006; 5 (11): 2624-2633
- **Protease-modulated cellular uptake of quantum dots** *NANO LETTERS*
  Zhang, Y., So, M. K., Rao, J.
  2006; 6 (9): 1988-1992
- **A self-assembled quantum dot probe for detecting beta-lactamase activity** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Xu, C., Xing, B., Rao, H.
  2006; 344 (3): 931-935

- **Detection of mRNA in mammalian cells with a split ribozyme reporter** *CHEMBIOCHEM*
  Hasegawa, S., Gowrishankar, G., Rao, J.
  2006; 7 (6): 925-928
- **Modulating the splicing activity of Tetrahymena ribozyme via RNA self-assembly** *FEBS LETTERS*
  Hasegawa, S., Rao, J. H.
  2006; 580 (6): 1592-1596
- **Self-illuminating quantum dot conjugates for in vivo imaging** *NATURE BIOTECHNOLOGY*
  So, M. K., Xu, C. J., Loening, A. M., Gambhir, S. S., Rao, J. H.
  2006; 24 (3): 339-343
- **HaloTag protein-mediated site-specific conjugation of bioluminescent proteins to quantum dots** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
  Zhang, Y., So, M., Loening, A. M., Yao, H., Gambhir, S. S., Rao, J.
  2006; 45 (30): 4936-4940
- **Creating self-illuminating quantum dot conjugates** *NATURE PROTOCOLS*
  So, M., Loening, A. M., Gambhir, S. S., Rao, J.
  2006; 1 (3): 1160-1164
- **Cell-permeable near-infrared fluorogenic substrates for imaging beta-lactamase activity** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Xing, B., Khanamiryan, A., Rao, J. H.
  2005; 127 (12): 4158-4159
- **Single-cell detection of trans-splicing ribozyme in vivo activity** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Hasegawa, S., Choi, J. W., Rao, J. H.
  2004; 126 (23): 7158-7159
- **Imaging Tetrahymena ribozyme splicing activity in single live mammalian cells** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Hasegawa, S., Jackson, W. C., Tsien, R. Y., Rao, J.
  2003; 100 (25): 14892-14896
- **Novel fluorogenic substrates for imaging 6-lactamase gene expression** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Gao, W. Z., Xing, B. G., Tsien, R. Y., Rao, J. H.
  2003; 125 (37): 11146-11147
- **Design, synthesis, and characterization of a high-affinity trivalent system derived from vancomycin and L-Lys-D-Ala-D-Ala** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Rao, J. H., Lahiri, J., Weis, R. M., Whitesides, G. M.
  2000; 122 (12): 2698-2710
- **Binding of a dimeric derivative of vancomycin to L-Lys-D-Ala-D-lactate in solution and at a surface** *CHEMISTRY & BIOLOGY*
  Rao, J. H., Yan, L., Lahiri, J., Whitesides, G. M., Weis, R. M., Warren, H. S.
  1999; 6 (6): 353-359
- **Using surface plasmon resonance to study the binding of vancomycin and its dimer to self-assembled monolayers presenting D-Ala-D-Ala** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Rao, J. H., Yan, L., Xu, B., Whitesides, G. M.
  1999; 121 (11): 2629-2630
- **A trivalent system from vancomycin center dot D-Ala-D-Ala with higher affinity than avidin center dot biotin** *SCIENCE*
  Rao, J. H., Lahiri, J., Isaacs, L., Weis, R. M., Whitesides, G. M.
  1998; 280 (5364): 708-711
- **Affinity capillary electrophoresis: A physical-organic tool for studying interactions in biomolecular recognition** *ELECTROPHORESIS*
  Colton, I. J., Carbeck, J. D., Rao, J., Whitesides, G. M.
  1998; 19 (3): 367-382
- **Tight binding of a dimeric derivative of vancomycin with dimeric L-Lys-D-Ala-D-Ala** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*

Rao, J. H., Whitesides, G. M.
1997; 119 (43): 10286-10290

- **Using capillary electrophoresis to study the electrostatic interactions involved in the association of D-Ala-D-Ala with vancomycin** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Rao, J. H., Colton, I. J., Whitesides, G. M.
  1997; 119 (40): 9336-9340