

Juanjuan HUANG

Assistant beamline scientist, Advanced Photon Source, Argonne National Laboratory

Homepage: <https://cathybrook.github.io>

EXPERTISE & SUMMARY

- **Multi-modal X-ray characterization**
 - Six years of experience in developing dispersive XAS instrumentation (image-based single-shot XAS technique).
 - Extensive theoretical and experimental knowledge, combined with hands-on expertise in XAS/XES, XANES-mapping, XRF mapping, X-ray spectral and spectro-imaging (such as K-edge imaging and TXM-XANES), X-ray micro-tomography, and X-ray phase-contrast imaging.
- **Data & Image analysis, software development**
 - Main developer to data analysis, and beamline control software (see examples <https://github.com/Cathyhji>)
 - Proficient in routine imaging analysis using Python packages with fundamental knowledge of machine learning and deep learning frameworks.
 - Very familiar with various 2D and 3D graphic and analysis software.
- **Multidisciplinary background**
 - Multidisciplinary background, including a Ph.D. in physics, a master's degree in materials science, and a bachelor's degree in chemistry, with a strong publication record across these fields.

EDUCATION

- 01/2018 – 07/2022 **Ph.D (Doktor der Naturwissenschaften) in Physics**
Physics department, Technical University of Munich (TUM)
- 09/2015 – 08/2017 **Master of Science (dual degree) in Materials Science exploiting Large-Scale Facilities**
Ludwig-Maximilians-University Munich (LMU)
Université de Montpellier II (UM2)
 - Erasmus Mundus Scholarship (43,000 € for two years)
 - GPA: 1.11/1.0 (very good, Germany); 17.9/20 (very good, France)
 - Labex CheMiSyst prize (ranked 1st in the Chemistry department of UM2 for year 2017)
- 09/2011 – 08/2015 **Bachelor of Science in Chemistry**
Sun Yat-Sen (Zhong Shan) University (SYSU, top 10 universities in China)
 - GPA: 3.7/4.0, Outstanding Student Scholarship 2011 - 2012 & 2012 – 2013
 - Summer exchange at the University of British Columbia (UBC), Canada in 2014

PROFESSIONAL EXPERIENCE

- Lemont, USA
10/2023 – present **Assistant beamline scientist – the Advanced Photon Source, Argonne National Laboratory**
Group leader: *Dr. Shelly Kelly*
 - Develop X-ray technologies at the most brilliant X-ray synchrotron source in the world.
 - Maintain instrumentation/hardware/software related to X-ray spectroscopy techniques, and support large facility users from academia and industry.
 - Explore scientific usages of X-ray spectroscopy techniques in multidisciplinary fields.

Lemont, USA 10/2022 – 9/2023	Postdoctoral Appointee – the Advanced Photon Source, Argonne National Laboratory Supervisor: <i>Dr. George Sterbinsky</i> ; Group leader: <i>Dr. Shelly Kelly</i> <ul style="list-style-type: none"> Research project entitled “<i>Resolving Capacity Fade in Li-Ion Batteries with Single-Shot Chemical Mapping</i>”. Implemented dispersive X-ray absorption spectroscopy (DXAS) for fast XANES-imaging on beamline ID25, APS and applied to Li-ion batteries.
Munich, GERMANY 01/2018 – 07/2022	Doctoral researcher – Department of physics, Technical University of Munich (TUM) Supervisors: <i>Dr. Martin Dierolf</i> , <i>Prof. Dr. Franz Pfeiffer</i> Research group: Chair of biomedical physics (E17) <ul style="list-style-type: none"> Research topic: X-ray absorption spectroscopy at the Munich Compact Light Source. PhD thesis entitled “<i>Development of a Laue-Setup at an Inverse-Compton X-ray Source and its Applications in X-ray Absorption Spectroscopy and Spectral Imaging</i>”. Developed the first XAS with an inverse Compton source world-wide. Successfully applied the instrument to chemistry and catalysis. Worked on advanced novel X-ray methodologies, including spectral/spectro-imaging. Attended Hercules synchrotron school and got trainings at ESRF (Grenoble, France), Elettra/FERMI (Trieste, Italy), and PETRA III & European XFEL (Hamburg, Germany).
Menlo Park, USA 12/2019 – 03/2020	Short-term research scholar - Stanford Synchrotron Radiation Lightsource (SSRL) Supervisor: <i>Dr. Yijin Liu</i> <ul style="list-style-type: none"> Worked on BL 6-2c (transmission X-ray microscope). Hands-on experience on 3d XANES imaging and data analysis
Grenoble, FRANCE 03/2017 – 08/2017	Master's researcher - European Synchrotron Radiation Facility (ESRF) Supervisor: <i>Dr. Marius Retegan</i> ; Group leader: <i>Dr. Pieter Glatzel</i> (beamline ID 26) <ul style="list-style-type: none"> Master's thesis entitled: “<i>The Electronic Structure of Mononuclear Manganese Compounds: Experimental and Theoretical Insights from X-Ray Absorption Spectroscopy and Resonant Inelastic X-Ray Scattering</i>”.
05/2016 – 08/2016	<ul style="list-style-type: none"> Internship: <i>XANES, valence-to-core XES simulation of transitional metal containing complexes using ORCA package.</i>
Guangzhou, CHINA 06/2014 – 09/2015	Bachelor's research - Sun Yat-Sen (Zhong Shan) University <ul style="list-style-type: none"> Bachelor thesis entitled: “<i>The Study of Cyclometalated Iridium(III) Complexes Application in Specific Mitochondrial Live Imaging</i>”.
12/2011 – 05/2013	<ul style="list-style-type: none"> Research internship: <i>Quantum Dot-Sensitized Solar Cells.</i>

INTERNATIONAL CONFERENCE (INVITED ONLY)

06/2024	Conference: International Symposium on Compact Synchrotron X-ray Sources 2024 [invited] “ <i>Dispersive X-ray Absorption Spectroscopy at the Munich Compact Light Source (MuCLS) and the Advanced Photon Source (APS)</i> ”
03/2021	Conference: X-ray Spectroscopy beyond Beamlines [invited] “ <i>Dispersive X-ray absorption spectroscopy with an inverse Compton source</i> ”
08/2020	Webinar: Global XAS Journal Club [invited] “ <i>Energy Dispersive X-ray absorption spectroscopy at the Munich Compact Light Source</i> ”

TEACHING EXPERIENCE

The University of Texas at Austin

03/02/2025 Invited guest lecture for course "X-ray Metrology for Materials and Manufacturing Engineering"

National School on Neutron and X-Ray Scattering, Argonne National Laboratory

07/29 – 08/02/2024 Workshop topic session on "X-ray monochromators and mirrors"

Technical University of Munich

09/2021 – 10/2021 Lab course "Dual-energy micro-CT"

10/2018 – 08/2021 Semester seminar and exercise course "Modern X-ray physics"

04/2018 – 08/2018 Python exercise course "Image processing in physics"

PUBLICATIONS

1) In-device Battery Failure Analysis.

G. Qian, G. Zan, J. Li, D. Meng, T. Sun, V. Thampy, A. M. Yanyachi, X. Huang, H. Yan, Y. S. Chu, S. Gul, **J. Huang**, S. D. Kelly, S. J. Lee, J. S. Lee, W. Yun, P. Cloetens, P. Pianetta, K. Zhao, O. A. Ezekoye, Y. Liu. [Adv. Mater. 2025, 2416915.](#)

2) Engineering a Cu-Pd paddle-wheel metal-organic framework for selective CO₂ electroreduction.

R. Zhang, Y. Liu, P. Ding, **J. Huang**, M. Dierolf, S. D. Kelly, X. Qiu, et al. [Angew. Chem. Int. Ed. 2024, 63 \(51\). e202414600.](#)

3) On the Mechanism of Catalytic Decarboxylation of Carboxylic Acids on Carbon-Supported Palladium Hydride.

F. Deng, **J. Huang**, E. Ember, K. Achterhold, M. Dierolf, A. Jentys, Y. Liu, F. Pfeiffer, J.A. Lercher. [ACS. Catal. 2021, 14625-14634.](#)

4) Laboratory-scale *in situ* X-ray absorption spectroscopy of a palladium catalyst on a compact inverse-Compton scattering X-ray beamline.

J. Huang, F. Deng, B. Günther, K. Achterhold K, Y. Liu, A. Jentys, J.A. Lercher, Dierolf, F. Pfeiffer. [J. Anal. Atom. Spectrom., 2021, 36, 2649-2659.](#)

5) Simultaneous Two-Color X-Ray Absorption Spectroscopy Using Laue Crystals at an Inverse-Compton Scattering X-Ray Facility.

J. Huang, B. Günther, K. Achterhold K, M. Dierolf, F. Pfeiffer. [J. Synchrotron Radiat. 2021, 28, 6.](#)

6) Energy-Dispersive X-ray Absorption Spectroscopy with an Inverse Compton Source.

J. Huang, B. Günther, K. Achterhold K, Y. Cui, B. Gleich, M. Dierolf, F. Pfeiffer. [Sci. Rep., 2020, 10, 8772.](#)

7) The Versatile X-ray Beamline of the Munich Compact Light Source: Design, Instrumentation and Applications.

B. Günther, R. Gradl, C. Jud, E. Eggl, **J. Huang**, S. Kulpe, K. Achterhold, B. Gleich, M. Dierolf, F. Pfeiffer. [J. Synchrotron Rad., 2020, 27, 5.](#)

8) Targeting the ubiquitin-proteasome pathway to overcome anti-cancer drug resistance.

S. Narayanan, C.-Y. Cai, Y. G. Assaraf, H.-Q. Guo, Q. Cui, L. Wei, **J. Huang**, C. R. Ashby Jr, Z.-S. Chen. [Drug Resist. Updat., 2020, 48, 100663.](#)

9) Long non-coding RNAs regulate drug resistance in cancer.

K. Liu, L. Gao, X. Ma, J.-J. Huang, J. Chen, L. Zeng, C. R. Ashby, C. Zou, Z.-S. Chen. [Mol. Cancer, 2020, 19\(1\).](#)

10) A self-assembled Ru-Pt metallacage as a lysosome-targeting photosensitizer for 2-photon photodynamic therapy.

Z. Zhou, J. Liu, **J. Huang**, T. W. Rees, Y. Wang, H. Wang, X. Li, H. Chao, and P. J. Stang. [Natl. Acad. Sci., 2019, 116\(41\), 20296-20302.](#)

11) An organoruthenium complex overcomes ABCG2-mediated multidrug resistance via multiple mechanisms

Zeng, J. Li, C. Zhang, Y.-K. Zhang, W. Zhang, **J. Huang**, C. R. Ashby, Z.-S. Chen, and H. Chao. [Chem. Commun., 2019, 55\(26\), 3833-3836.](#)

12) Interfering with DNA High - Order Structures using Chiral Ruthenium (II) Complexes.

S. Zou, G. Li, T. W. Rees, C. Jin, **J. Huang**, Y. Chen, L. Ji, and H. Chao. [Chem. Eur. J., 2018, 24\(3\), 690-698.](#)

13) Oncosis-inducing cyclometalated iridium (iii) complexes.

R. Guan, Y. Chen, L. Zeng, T. W. Rees, C. Jin, **J. Huang**, Z.-S. Chen, L. Ji, and H. Chao. [Chem. Sci., 2018, 9\(23\), 5183-5190.](#)

14) Crossfire for two-photon photodynamic therapy with fluorinated ruthenium (II) photosensitizers.

K. Qiu, J. Wang, C. Song, L. Wang, H. Zhu, H. Huang, **J. Huang**, H. Wang, L. Ji, and H. Chao. [ACS Appl. Mater. Interfaces, 2017, 9\(22\), 18482-18492.](#)

15) Rational design of NIR-emitting iridium (III) complexes for multimodal phosphorescence imaging of mitochondria under two-photon excitation.

C. Jin, R. Guan, J. Wu, B. Yuan, L. Wang, **J. Huang**, H. Wang, L. Ji, and H. Chao, [Chem. Commun., 2017, 53\(75\), 10374-10377.](#)

16) Two-photon Luminescent Metal Complexes for Bioimaging and Cancer Phototherapy.

- Y. Chen, R. Guan, C. Zhang, **J. Huang**, L. Ji, H. Chao. [*Coord. Chem. Rev.* 2016, 310, 16-40.](#)
- 17) Real-time tracking mitochondrial dynamic remodeling with two-photon phosphorescent iridium (III) complexes. H. Huang, L. Yang, P. Zhang, K. Qiu, **J. Huang**, Y. Chen, J. Diao, J. Liu, L. Ji, J. Long, and H. Chao. [*Biomaterials*, 2016, 83, 321-331.](#)
- 18) Mitochondrial Dynamics Tracking with Two-Photon Phosphorescent Terpyridyl Iridium(III) Complexes
Y. Chen, R. Guan, C. Zhang, **J. Huang**, L. Ji, H. Chao. [*Coord. Chem. Rev.* 2016, 310, 16-40.](#)
- 19) Highly Charged Ruthenium(II) Polypyridyl Complexes as Lysosome-Localized Photosensitizers for Two-Photon Photodynamic Therapy.
H. Huang, P. Zhang, P. Qiu, **J. Huang**, Y. Chen, L. Ji, and H. Chao, [*Sci. Rep.*, 2016\(1\), 20887.](#)
- 20) Noncovalent Ruthenium(II) Complexes–Single-Walled Carbon Nanotube Composites for Bimodal Photothermal and Photodynamic Therapy with Near-Infrared Irradiation.
P. Zhang, H. Huang, **J. Huang**, H. Chen, J. Wang, K. Qiu, D. Zhao, L. Ji, and H. Chao. [*ACS. Appl. Mater. Interfaces*, 2015, 7 \(41\), 23278-23290.](#)
- 21) Unexpected High Photothermal Conversion Efficiency of Gold Nanospheres upon Grafting with Two-Photon Luminescent Ruthenium(II) Complexes: A Way Towards Cancer Therapy?
P. Zhang, J. Wang, H. Huang, B. Yu, K. Qiu, **J. Huang**, S. Wang, L. Jiang, G. Gasser, L. Ji, H. Chao, [*Biomaterials*, 2015, 63, 102-114.](#)
- 22) A Dendritic Nano-Sized Hexanuclear Ruthenium(II) Complex as a One and Two-Photon Luminescent Tracking Non-Viral Gene Vector.
K. Qiu, B. Yu, H. Huang, P. Zhang, **J. Huang**, S. Zou, Y. Chen, L. Ji, H. Chao. [*Sci. Rep.*, 2015, 5, 10707.](#)