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 knowledge and 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/Cathyhjj)
  - Proficient in routine imaging analysis using Python packages with fundamental knowledge of machine learning and deep learning frameworks.
  - Familiar with 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: *Dr.* George Sterbinsky; Group leader: *Dr.* Shelly Kelly

- Research project entitled "*Resolving Capacity Fade in Li-Ion Batteries with Single-Shot Chemical Mapping*".
- 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: *Dr.* Martin Dierolf, *Prof. Dr.* Franz Pfeiffer
Research group: Chair of biomedical physics (E17)

- Research topic: X-ray absorption spectroscopy at the Munich Compact Light Source.
- PhD thesis entitled *"Development of a Laue-Setup at an Inverse-Compton X-ray Source and its Applications in X-ray Absorption Spectroscopy and Spectral Imaging".*
- Developed the first XAS with an inverse Compton source world-wide.
- Successfully applied the instrument to chemistry and catalysis.
- Worked on 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: *Dr.* Yijin Liu

- Worked on BL 6-2c (transmission X-ray microscope).
- Hands-on experience on 3d XANES imaging and data analysis

Grenoble, FRANCE

Master's researcher **- European Synchrotron Radiation Facility (ESRF)**
Supervisor: *Dr.* Marius Retegan; Group leader: *Dr.* Pieter Glatzel (beamline ID 26)

03/2017 – 08/2017
- Master's thesis entitled: *"The Electronic Structure of Mononuclear Manganese Compounds: Experimental and Theoretical Insights from X-Ray Absorption Spectroscopy and Resonant Inelastic X-Ray Scattering"*.

05/2016 – 08/2016
- Internship: *XANES, valence-to-core XES simulation of transitional metal containing complexes using ORCA package.*

Guangzhou, CHINA

Bachelor's research **- Sun Yat-Sen (Zhong Shan) University**

06/2014 – 09/2015
- Bachelor thesis entitled: *"The Study of Cyclometalated Iridium(Iii) Complexes Application in Specific Mitochondrial Live Imaging"*.

12/2011 – 05/2013
- Research internship: *Quantum Dot-Sensitized Solar Cells*.

INTERNATIONAL CONFERENCE (INVITED ONLY)

07/2021
Conference: **International Symposium on Compact Synchrotron X-ray Sources 2024** [invited]
"Dispersive X-ray Absorption Spectroscopy at the Munich Compact Light Source (MuCLS) and the Advanced Photon Source (APS)"

03/2021
Conference: **X-ray Spectroscopy beyond Beamlines** [invited]
"Dispersive X-ray absorption spectroscopy with an inverse Compton source"

08/2020
Webinar: **Global XAS Journal Club** [invited]
"Energy Dispersive X-ray absorption spectroscopy at the Munich Compact Light Source"

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 Photothemal 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.