

Current Position

2022–Present **Lecturer**, *China University of Petroleum (Beijing)*, China.

Education

2017–2022 **PhD, Petroleum Engineering**, *The University of New South Wales*, Australia,

- Supervisor: [Christoph Arns](#), [Igor Shikhov](#)
- Research focus: digital core analysis, computational modeling, porous media.

2013–2017 **BEng, Petroleum Engineering**, *China University of Petroleum (East China)*,

- Overall GPA – 3.92/4.00 by WES, Ranking 1/432
- Exchange student at UNSW, Spring 2017.

Research Interests

I am interested in building efficient and scalable computational models for inverse problems arising from (Bayesian) parameter estimation and uncertainty quantification in subsurface environments, core analysis, hydrological modeling, etc. Currently, I focus on developing practical multi-objective Bayesian optimization approaches to the estimation of key physical parameters under various physical constraints.

Publications

Journal Articles

- 2022 **Bayesian optimization with transfer learning: A study on spatial variability of rock properties using NMR relaxometry**
Rupeng Li, Igor Shikhov, and Christoph Arns
Water Resources Research, [top journal in hydrology](#) [AGU]
- 2022 **A Bayesian optimization approach to the simultaneous extraction of intrinsic physical parameters from T_1 and T_2 relaxation responses**
Rupeng Li, Igor Shikhov, and Christoph Arns
SPE Journal, [#1 in petroleum engineering](#) [OnePetro]
- 2022 **Tuning the intentional corona of cerium oxide nanoparticles to promote angiogenesis via fibroblast growth factor 2 signalling**
Lu Fu, **Rupeng Li**, Whitelock John, and Megan Lord
Regenerative Biomaterials [OUP]
- 2021 **Solving multiphysics, multiparameter, multi-modal inverse problems: an application to NMR relaxation in porous media**
Rupeng Li, Igor Shikhov, and Christoph Arns
Physical Review Applied, [top journal in physics](#) [APS]
- 2021 **Mechanisms of confining pressure dependence of resistivity index for tight sandstones by digital core analysis**
Hongyi Dai, Igor Shikhov, **Rupeng Li**, and Christoph Arns
SPE Journal [OnePetro]

- 2021 **A numerical study of field strength and clay morphology impact on NMR transverse relaxation in sandstones**
Yingzhi Cui, Igor Shikhov, **Rupeng Li**, Shitao Liu, and Christoph Arns
Journal of Petroleum Science and Engineering [\[Elsevier\]](#)
- 2020 **A topology-based single-pool decomposition framework for large-scale global optimization**
Xiaoming Xue, Kai Zhang, **Rupeng Li**, Liming Zhang, Chuanjin Yao, Jian Wang, and Jun Yao
Applied Soft Computing [\[Elsevier\]](#)
- 2018 **Relaxation and relaxation exchange NMR to characterise asphaltene adsorption and wettability dynamics in siliceous systems**
Igor Shikhov, **Rupeng Li**, and Christoph Arns
Fuel [\[Elsevier\]](#)
[Conference Proceedings](#)
- 2023 **A Bayesian optimization approach to the extraction of intrinsic physical parameters from T₂ relaxation response**
Rupeng Li, Igor Shikhov, and Christoph Arns
International Symposium of the Society of Core Analysts, Austin, Texas [\[E3S\]](#)
- 2017 **T₂-store-T₂ Relaxation Exchange NMR to Characterize Effect of Asphaltenes on Wettability Dynamics in Siliceous Systems**
Igor Shikhov, **Rupeng Li**, and Christoph Arns
International Symposium of the Society of Core Analysts, Vienna, Austria [\[jgmaas\]](#)

Talks

- 2024 **An approach to eliminating additional dephasing due to internal magnetic field gradients in NMR measurements using multi-objective Bayesian optimization**
Rupeng Li, Igor Shikhov, and Christoph Arns
Poster presentation at the 16th International Bologna Conference on Magnetic Resonance in Porous Media (MRPM), Tromsø, Norway
- 2022 **A Bayesian optimization approach to the extraction of intrinsic physical parameters from T₂ relaxation responses**
Rupeng Li, Igor Shikhov, and Christoph Arns
Oral presentation at the 35th International Symposium of the Society of Core Analysts (SCA), Austin, Texas
- 2022 **Determination of intrinsic physical properties of porous media by solving inverse problems in Laplace NMR relaxometry using Bayesian optimization**
Rupeng Li, Igor Shikhov, and Christoph Arns
Poster presentation at the 15th International Bologna Conference on Magnetic Resonance in Porous Media (MRPM), Hangzhou, China
- 2020 **Effective parameter identification via NMR experiment and simulation using multi-task inverse solution workflow**
Rupeng Li, Igor Shikhov, and Christoph Arns
Oral presentation at the 12nd Annual Meeting of Interpore, Qingdao, China
- 2019 **Identification of surface relaxivities and effective diffusion coefficients governing relaxation processes in porous media by matching T₂ distributions through Bayesian optimization**
Rupeng Li, Igor Shikhov, and Christoph Arns
Oral presentation at the 12nd Australia and New Zealand society for Magnetic Resonance conference (ANZMAG), Perth, Australia

- 2019 **Identification of physical properties governing relaxation process in saturated rocks by matching experimental T_2 distributions and CT-image based NMR simulation through SL-particle swarm optimization**
Rupeng Li, Igor Shikhov, and Christoph Arns
Poster presentation at the 15th International Conference on Magnetic Resonance Microscopy (ICMRM), Paris, France
- 2018 **Accelerated simulation of NMR T_1 relaxation in digitized porous media using first-passage equations**
Rupeng Li, Igor Shikhov, and Christoph Arns
Poster presentation at the 8th Biennial Western Sydney University Symposium on NMR, MRI and Diffusion, Sydney, Australia

Teaching

- 2023-Present Lecturer, Undergraduate Physics (II)
 - Prepared and delivered physics to a large class of **124** students.
 - Course evaluation: ranking 127 out of a total of 1012 courses university-wide (**top 12.5%**).
 - Provided 1-on-30 tutoring to students who were initially struggling, scoring below 30 on their mid-term assessments. After several tutoring sessions, they achieved on average a score of 75 on the final exam, with the highest achieved score of 92 (**ranking 8/124**).
- 2023-Present Lecturer, Physics Experiments (I) & (II)
 - Created and delivered physical experiments: principle and application of oscilloscope; determination of wavelength of light using Newton's rings or a grating, etc.
- 2022 Teaching Assistant, Undergraduate Physics (II)
- 2022 Teaching Assistant, Physics Experiments (II)
- 2018-2020 Teaching Assistant, PTRL3030 & PTRL5021, Reservoir Characterization
 - Created and delivered simple and ordinary Kriging interpolation, stochastic simulation, up-scaling and their applications in geological modeling.

Grants and Awards

- 2022-2024 Distinguished Early-Career Researcher Fellowship (\$120k)
 - *Geological parameter estimation using Bayesian optimization*
 - 500 researchers per year for overseas doctorate degree recipients, top 3%
- 2022 Poster Presentation Award at the 15th International Bologna Conference on Magnetic Resonance in Porous Media
- 2018 Poster Presentation Award at the 8th NMR, MRI & Diffusion Symposium
- 2017-2022 UNSW Doctorate Scholarship
- 2016 4th place in SPE Asia Pacific Oil & Gas Conference and Exhibition Paper Contest
- 2016 Exchange Student Scholarship, UNSW & Chinese Scholarship Council
- 2014-2016 National Scholarship - **1/432**, awarded 3 years in a row, CUPE