

# Xiongming Dai

Ph.D. Candidate

Division of Computer Science and Engineering

Louisiana State University

Baton Rouge, LA

Email: [xdai2@lsu.edu](mailto:xdai2@lsu.edu), [daixiongming@gmail.com](mailto:daixiongming@gmail.com)

Personal Website: <https://daixiongming.github.io/>

Cell : (225)-228-5162

## Research and Hobbies

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I am a Ph.D. candidate at Louisiana State University. Currently, I am working towards State Estimation for Sequential Data Analysis. I have been actively involved in various inter-disciplinary researches. My research interest includes Bayesian Learning, Monte Carlo Sampling, Tracking, Simultaneous Localization and Mapping (SLAM), Robotics, Anomaly Detection (Deep One-Class Learning), Optimal Control and Estimation, Evolutionary Algorithm, Graph Theory and Riesz Potentials. I am crazy about Mathematics, Cooking, Drawing and Playing Basketball & Badminton.

**I am looking for a full-time job related to Machine Learning, Computer Vision, Robotics and Autonomous Driving (Visual SLAM) now!**

## Experience

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Graduate Research & Teaching Assistant      Louisiana State University      May 2018 - Present

- Responsible for theoretical research of resampling for sequential Monte Carlo, and have proposed a repetitive ergodicity in deterministic domain with median, it is faster than the state of the art, which is verified by theoretical deduction and experiments of a hidden Markov model in both the linear and non-linear cases.
- Responsible for theoretical research of optimal camera configuration for large-scale motion capture systems, a NP hard problem, and have developed a 3D simulation framework, further introduce Riesz potentials to discretize rectifiable submanifolds of the maximum overlapping coverage, it proves that the proposal grows at most logarithmically, under mild assumptions.
- Responsible for theoretical research of Monte Carlo Sampling, and have proposed a weighted Riesz potentials interaction, where only few samplers required to achieve high performance for hidden Markov model.

Director      Shenzhen Realis Multimedia Technology Co.,Ltd.      Jul 2016 - Aug 2017

- Responsible for the location and tracking of infrared reflective markers corresponding to rigid bodies to realize multiplayer motion capture.
- Responsible for the optimization of optimal camera configuration solutions.
- Responsible for the optimization of the inverse kinematics and the integration of the system.

- Project Leader                      Shenzhen Realis Multimedia Technology Co.,Ltd.                      Feb 2016 - Jun 2016
- Served as a leader for developing inverse kinematics software from scratch.
  - Responsible for the configuration and optimization of the infrared reflective markers solution so that the corresponding rigid body is most easily captured by the camera system.
  - Responsible for the interactive communication mechanism between cameras to ensure minimum latency of the camera system.
- Senior Software Development Engineer    Hunan VisualTouring Technology Co.,Ltd.    Jun 2015 - Jan 2016
- Responsible for service robot multitasking development based on robotic systems ROS.
  - Responsible for theoretical research of Visual SLAM and related software development.
  - Responsible for 3D reconstruction of interior scenes.
  - Responsible for 3D face recognition based on 3-dimensional projection volume invariance feature.
- Graduate Research Assistant    Huazhong University of Science & Technology    Aug 2012 - May 2015
- Software Development Engineer    Huazhong Numerical Control Co.,Ltd.                      Aug 2012 - May 2015
- Responsible for calibration research and software development of industrial robot systems.
  - Responsible for the algorithm research and software development of CNC toolpaths in order to obtain smooth machining results.

## Education

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Louisiana State University	Computer Science	Ph.D., (Nov, 2022 (Expected))
Louisiana State University	Computer Science	M.Sc., 2022
Huazhong University of Science & Technology	Mechatrical Engineering	M.Sc., 2015
Changsha University of Science & Technology	Mechanical Engineering	M.Sc., 2012

## Publications

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- **Xiongming Dai**, Gerald Baumgartner. **Weighted Riesz Particles**. Neural Information Processing Systems(NeurIPS), 2022 submitted
  - **Xiongming Dai**, Gerald Baumgartner. **Optimal Camera Configuration for Large-Scale Motion Capture Systems**. Neural Information Processing Systems(NeurIPS), 2022 submitted
  - **Xiongming Dai**, Gerald Baumgartner, **Variance Reduction of Resampling for Sequential Monte Carlo**. Association for the Advancement of Artificial Intelligence(AAAI), 2022 submitted

## Awards

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- Three software copyright
- Two inventive patents
- 2nd place in the 3rd Changsha University of Technology Cooking Competition
- 2009-2010 School of Mechanical Engineering at Changsha University of Sci&Tech 1 on 1 Basketball competition champion, called “The King of 1 on 1”.
- The team got the 3rd place in the 15th HUST Graduate Cup Soccer League, Forward
- The team got the 2nd place in the 25th HUST Graduate Cup Basketball League, Small Forward

## Technical Strengths

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- **Languages Proficient:** Python, R, Matlab, C/C++, Shell.
- **Robotic System:** ROS operating system
- **GPU Programming:** NVIDIA CUDA
- **Computer Vision/Graphics:** OpenGL, OpenCV.
- **SDLC/Documentation:** LaTeX, Overleaf
- **Platforms/ Frameworks:** Windows, UNIX/Linux •
- **Others:** Git
- **The Most Important:** non-stopable and perseverance in learning