

# Chengshuai (Abraham) Yang, Ph.D.

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## RESEARCH INTERESTS

- Hybrid multi-modal imaging systems and image-guided therapy (optical, radioluminescence, spectral/hyperspectral).
- Computational imaging & inverse problems for biomedical applications (physics-based modeling, calibration, and reconstruction).
- Optimization + learned priors (plug-and-play, unrolled methods, diffusion priors) with robustness and uncertainty quantification.
- Scalable, reproducible benchmarking and automated experiment design (“AI Scientist” workflows).

## EDUCATION

**Postdoctoral Training — University of California, Los Angeles (UCLA)** (Oct 2021 – Sep 2023)

Machine Learning (major); Optical/Biomedical Imaging (minor)

**Ph.D. — East China Normal University (ECNU)** (Sep 2015 – Jun 2020)

Optical Imaging (major); Machine Learning (minor)

**B.S. — Nantong University** (Sep 2011 – Jun 2015)

Applied Physics (major); Computer Science (minor)

## ACADEMIC & INDUSTRY POSITIONS

**Research Director — CompareGPT.io and NextGen PlatformAI C Corp** (San Jose/Los Angeles, CA; Mar 2024 – Present)

- Founded and lead a research-driven AI company building axiom-checked, trustworthy AI agents for scientific computing and data analysis.
- Direct research on multi-agent “AI Scientist” systems that couple probabilistic models, deep learning, and symbolic tools to perform end-to-end statistical workflows (data curation → modeling → uncertainty analysis → reporting).
- Initiated early-stage collaborations: (i) Prof. David J. Brady (University of Arizona) on multi-aperture imaging fusion; (ii) Biophotonics Lab (Caltech) on Fourier ptychographic imaging with physics-guided learning.
- Built scalable multi-GPU experiment infrastructure for evaluating algorithms under distribution shift, noise variation, and model mismatch.

**Machine Learning Engineer — Workmagic** (San Francisco, CA; Oct 2023 – Mar 2024)

- Led diffusion-based generative video modeling for advertising; built data curation, evaluation, and error-analysis pipelines.
- Built a virtual try-on system (segmentation + generative refinement) and evaluated robustness using statistical measures and user-study feedback.
- Prototyped an internal GPT-4-powered product copilot integrating LLMs into data workflows.

**Postdoctoral Scholar — University of California, Los Angeles (UCLA), Dept. of Electrical and Computer Engineering** (Los Angeles, CA; Oct 2021 – Sep 2023)

- Developed diffusion- and GAN-based statistical models for light-field tomography and hyperspectral imaging with likelihood-based reconstruction and data-efficient learning.
- Proposed unsupervised / meta-learning frameworks for inverse problems, treating reconstruction as Bayesian inference under learned priors.
- Implemented reproducible pipelines for hyperparameter tuning, statistical evaluation, and ablation studies; managed multi-GPU experiments.
- Collaborated with clinicians and statisticians to design evaluation protocols for imaging biomarkers and downstream outcome models.

**Machine Learning Optics Team Leader — Westlake University** (Hangzhou, China; Oct 2020 – Sep 2021)

- Founded and led a computational imaging + ML group (5 Ph.D. students + RAs).
- Published in ECCV 2022 and IJCV 2023 on scalable deep unfolding and adaptive plug-and-play reconstruction.
- Mentored students in algorithm development, coding practice, experimental design, and manuscript preparation.

**Research Assistant / Ph.D. Student — East China Normal University (ECNU)** (Shanghai, China; Sep 2015 – Jun 2020)

- Researched compressed ultrafast photography, single-pixel imaging, and deep unfolding methods for inverse problems.
- Collaborated on national research projects in computational optics and deep learning; mentored junior graduate students.

## **RESEARCH PROJECTS (Selected; Most Relevant to Hybrid Imaging + Reconstruction)**

**Physics World Model (PWM) — unified benchmarking + calibration for imaging forward models**

- Open-source repository: [https://github.com/integritynoble/Physics\\_World\\_Model](https://github.com/integritynoble/Physics_World_Model)
- Built a modular framework to define forward operators, run standardized reconstructions, and diagnose model mismatch across modalities.
- Supports reproducible run-bundles with metrics, logs, and plots to compare classical solvers (TV/FISTA, GAP-TV, etc.) and learned priors.

**InverseNet — forward-model estimation benchmark (dataset + evaluation) for computational imaging**

- Designed a CASP-like benchmark concept to estimate/calibrate forward operators from measurements, enabling systematic study of mismatch and robustness.

- Code/materials: [https://github.com/integritynoble/Physics\\_World\\_Model](https://github.com/integritynoble/Physics_World_Model).

#### **PWMI-CASSI — forward-model correction & calibration for CASSI (ECCV paper in preparation)**

- Developing dispersion-step mismatch correction and robust CASSI reconstruction using benchmark optimization baselines (e.g., GAP-TV) and learned priors.
- Project link: [https://github.com/integritynoble/Physics\\_World\\_Model](https://github.com/integritynoble/Physics_World_Model).

#### **Hybrid / multi-modal imaging algorithms**

- Experience designing physics-based reconstruction pipelines and robustness evaluation under noise, domain shift, and calibration uncertainty.
- Interest in translational imaging biomarkers for vascular disease characterization (composition, progression, and response-to-therapy).

#### **PUBLICATIONS** (*Full list available on [Google Scholar](#)*)

Yang, C.; Zhang, S.; Yuan, X. Ensemble Learning Priors Driven Deep Unfolding for Scalable Video Snapshot Compressive Imaging. ECCV (2022).

Wu, Z.; Yang, C.; Su, X.; Yuan, X. Adaptive Deep Plug-and-Play Algorithm for Video Snapshot Compressive Imaging. International Journal of Computer Vision (IJCV) 131(7): 1662–1679 (2023).

Yang, C.; Cao, F.; Qi, D.; et al. Hyperspectrally Compressed Ultrafast Photography. Physical Review Letters 124, 023902 (2020).

Yang, C.; Qi, D.; et al. Optimizing codes for compressed ultrafast photography by the genetic algorithm. Optica 5(2): 147–153 (2018).

Yang, C.; et al. High-fidelity image reconstruction for compressed ultrafast photography with multi-encoding. Photonics Research 9(2): B30–B40 (2021).

Zhao, R.; Yang, C.; Smith, R.T.; Gao, L. Coded aperture snapshot spectral imaging fundus camera. Scientific Reports 13: (2023).

Du, X.; et al. Label-free hyperspectral imaging and deep-learning prediction of neuronal functional dynamics. PNAS Nexus (2022). (Co-author)

#### **HONORS & AWARDS**

- Outstanding Ph.D. Award, East China Normal University (2020).
- Future Scientist Development Program Fellow, ECNU (2019).
- Academic Innovation Promotion Award, ECNU (2018).

#### **TEACHING & MENTORSHIP**

- Graduate mentorship: supervised/co-supervised Ph.D. and Master’s students at ECNU and Westlake University in computational imaging and machine learning.
- Developed practical training materials for physics-guided reconstruction networks and uncertainty-aware models in Python/PyTorch.

- Earlier teaching: mathematics, physics, and English to pre-university students in China.

## **PROFESSIONAL / COMMUNITY SERVICE**

- Open-source/community: developed reusable agent templates and evaluation sets; maintained reproducible research codebases for computational imaging.
- Manuscript preparation and mentoring support for junior researchers (algorithm design, experiments, writing).

## **TECHNICAL SKILLS**

- Programming: Python, C/C++, MATLAB, CUDA, SQL; Linux; Git; Docker.
- ML/Imaging: PyTorch, TensorFlow; inverse problems; optimization; plug-and-play; unrolled methods; diffusion priors; uncertainty/robustness evaluation.
- Systems: multi-GPU training/experiments; reproducible benchmarking pipelines; experiment tracking.
- Languages: English (professional), Chinese (native).