Chenyuan Li

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PERSONAL STATEMENT

Dr.Chenyuan Li, a research scientist with expertise in healthcare data science, AI foundation model (LLM) development. I bridge domain-specific knowledge with scalable AI solutions. Passionate about designing impactful, user-centered products that improve delivery through data and intelligence.

EDUCATION

***Ph. D. in Medical and Dental Sciences*, focus on Sports Dentistry, minor in Dental Materials Science** **Apr.2020-Mar.2024**

Tokyo Medical and Dental University, Graduate School of Medical and Dental Science Tokyo, Japan

Focused on Sports Dentistry, Advanced Biomaterials, Oral Implantology and Regenerative Dental Medicine, Dental Engineering.

***Research Student* in Maxillofacial Prosthodontics** **Oct.2019-Mar.2020**

Tokyo Medical and Dental University, Graduate School of Medical and Dental Science Tokyo, Japan

Bachelor of Medicine in Stomatology (DDS in Dentistry) **Sep.2014-Jun.2019**

Lishui University, School of Medicine and Health Lishui, China

Received comprehensive training in all specialized areas of dentistry, including Orthodontics and Oral and Maxillofacial Surgery etc... Also built a foundation in Oral Microbiology, Clinical Pharmacology, Medical Immunology, Medical Biology, Biochemistry, and Histoembryology etc…

WORK EXPERIENCES

Research Assistant **Aug.2024-Now**

The University of Texas Health Science Center at Houston Texas, United States

- Dental Foundation Model Development – Proposed and secured research funding; completed IRB and ethics submissions. Leveraged structured EHR data from 11 research institutions (>5M patient records) for model pretraining.
  - Designed SQL + Python preprocessing pipelines to join multi-table datasets with a long-path codebook structure, aggregating patient-level sequences by visit date.
  - Mapped diagnostic codes, treatment actions, and medication data into embedding vectors; constructed a domain-specific hierarchical coding system and semantic embedding space.
  - Training and validation for LLM base models (BERT, BGE-M3), evaluated embedding quality via silhouette score, t-SNE, and PCA visualizations.
  - Assembled multiple Python modules (training, meddataset, batchsample, medencoder, etc.) and implemented a PyTorch encoder architecture. Pretrained on cleaned EHR data with hyperparameter tuning, using MLM and length-of-stay loss with BERT-style masking to prepare for foundation model training.
  - Designed downstream task pipelines (e.g., clinical decision support, patient outcome prediction) and performed data quality assurance, including completeness checks, consistency validation, and outlier detection.
  - Authored a review paper "AI in Dentistry: From Machine Learning to Large Language Models" and released a curated, de-identified dental EHR dataset to support reproducible AI experiments, covering data cleaning, documentation, and ethical compliance.
- Patient Outcome Prediction – Applied PySpark for large-scale data preprocessing (cleaning, categorical encoding, feature engineering) and trained Random Forest classifiers with 70/30 train-test split, achieving >85% AUC-ROC.
- Medical Image Classification – Applied transfer learning to classify retinal images for disease detection, achieving 78% accuracy.
- Data Visualization – Designed Tableau dashboards to replicate Stephen Few's "Cost of Healthcare" visualization, integrating histograms, line charts, and interactive filters for drill-down analysis.
- Cancer Patient Cohort Analysis – Used Google Cloud BigQuery to query the MIMIC public medical database, performing cancer type classification and patient subgroup analysis.

Part-time Researcher **Apr.2024-Now**

Institute of Science Tokyo Tokyo, Japan

- Supported junior researchers post-graduation on project design, manuscript polishing, and peer-review guidance.

PhD Researcher **Apr.2020-Mar.2024**

Tokyo Medical and Dental University Tokyo, Japan

- Led R&D projects involving biomaterials and polymers in dental settings such as 3D printed sports mouthguard, nightguard.
- Collaborating with multidisciplinary teams on clinical protocol design and material performance evaluation such durability test.
- Managed and analyzed clinical data for research projects. Conducted statistical analysis using SPSS and R to evaluate durability and safety of dental polymers.
- Conducted DOE-based durability tests and statistical evaluations (SPSS, R) to optimize dental polymer formulations for mouthguards and splints.
- Research Publications: Contributed to 5 publications on digital dentistry (CAD/CAM) and 3D modeling applications for sports equipment, with articles published in Q1, IF8.4 journals like the International Journal of Bioprinting.
- Conference Presentations: Presented research on digital dentistry and text mining applications more than 10 international academic conferences.

Equity Research Intern **2022.12-2023.12**

Cinda Security Co.Ltd. Shenzhen, China

- Interfaced with institutional clients to support strategic decisions in healthcare sectors including vaccines, ophthalmology, and dental.
- Produced 12+ custom reports on biotech, medtech, and dental tech sectors; supported VC decisions.
- Initiated client communication, presented research proposals, and helped identify partnership opportunities with biotech firms.

Dentist **Jun.2018-Sep.2019**

Zhejiang Hospital Hangzhou, China

- Provided dental care, including restorative procedures, extractions, and assisting in dental implant surgeries.

Research Assistant **Jul.2017-Aug.2017**

Chinese Academy of Sciences Shanghai, China

- In vivo test assistance: Development of luciferase-labeled orthotopic xenograft mouse models for cancer research.

PROJECT EXPERIENCES

Medical Statistics with SPSS, R **| Zhejiang Chinese Medical University** **Mar.2021-Apr.2021**

- Applied statistical principles to analyze data using IBM SPSS and R software.

SKILLS

- Statistical Analysis: R, SPSS, Python, Biostatistics, Regression, Classification, Survival Analysis, Causal Inference
- 3D Design Software: ZBrush, Solidworks, Shapr3D, Materialise, Blender, Exocad
- Data Programming: Big Data Processing: PySpark, Apache Spark, SQL (BigQuery), Data Science & Machine Learning: Scikit-learn, Statsmodels, Pandas, NumPy, Deep Learning: Pytorch, Keras, Transformer, Data Visualization: Tableau, ggplot2, Matplotlib, Seaborn, AI/ML: Pytorch, Transformer, RNN, CNN, Random Forest, encoder architectures, pretraining strategies, and LoRA fine-tuning, model quality evaluation.
- Languages: English (Fluent, TOEIC 800+ similar), Japanese (JLPT N2)

AWARD

Scholarship

Wise Scholarship for support pioneer research initiated by next generation from JST Oct.2021-Mar.2024

Honors Scholarship for students with excellent academic records from JASSO Oct.2020-Mar.2022

Conference

Award of Oral Presentation: Neo Pharmaceutical Industry Award in JASD Nov.2023

PUBLICATIONS

- **Li C**, Wada T, Tsuchida Y, et al. Optimizing additively manufactured mouthguards: An evaluation of multi-layer materials for improved shock absorption and durability compared to conventionally fabricated samples. International Journal of Bioprinting. 2024;10(3)doi:10.36922/ijb.2469
- Aung TK, Churei H, **Li C**, et al. Shock absorption of 3D-printed ABS and fabric for sports faceguard. International Dental Journal. 2021/09/01/ 2021;71:S47-S48. doi.org/10.1016/j.identj.2021.08.041
- Aung TK, Churei H, **Li C**, et al. Air Permeability, Shock Absorption Ability, and Flexural Strength of 3D-Printed Perforated ABS Polymer Sheets with 3D-Knitted Fabric Cushioning for Sports Face Guard Applications. Polymers (Basel). Jun 5 2021;13(11)doi:10.3390/polym13111879
- Gen T, **Li C**, et al. Systematic Review of the Advances and Applications of Digital Dentistry in Sports Mouthguard Fabrication. International Journal of Sports Dentistry 2023
- Churei H, **Li C**, et al. A Literature Review on the Application of 3D Modeling Techniques to Mouthguard Fabrication. International Journal of Sports Dentistry 2023

PRESENTATIONS

- Xiangyi Liu, **Chenyuan Li**, Laila Rasmy, et al. Deep learning model for caries prediction using time-series dental records, 2025 AIMA summit (under review), USA
- **Chenyuan Li,** Hiroshi Churei, et al. Evaluation of shock absorption in various designed 3D printed samples Evaluation of shock absorption in various designed 3D printed samples. 2024 IADR/ AADOCR/ CADR General Session & Exhibition, New Orleans, USA
- **Chenyuan Li**. Retention force comparison of 3D multiple layer mouthguard and conventional mouthguard via cycle-loading durability fatigue test. The 34th Annual Meeting of the Japanese Academy of Sports Dentistry, Nov 18, 2023, Fukuoka, Japan
- **Chenyuan Li,** Hiroshi Churei, Chang Liu, Qiushuang Zhu, Zequn Li, Gen Tanabe, Toshiaki Ueno.Questionnaire survey on safety awareness for boxers in China. 2022 IADR (100th)/IADR APR(5th)，JUNE 20-25, 2022, Virtual Experience.
- **Chenyuan Li,** Hiroshi Churei, Toshiaki Ueno, et al. Impact absorption and distribution ability of 3D printed mouthguard material in contrasting orientations. The 78th General Session of the Japanese Society for Dental Materials and Devices, Online
- Gen Tanabe, Atsushi Iwaki, **Chenyuan Li,** et al. 3D printing of a shape memory photopolymer device with the use of a virtual articulator that has been designed on the basis of oral scan data and jaw movement data. The 35th Annual Meeting of the Japanese Academy of Sports Dentistry, Oct 12, 2024, Osaka, Japan
- Aung Thida, Hiroshi Churei, **Chenyuan Li,** et al. Simultaneous measurement of salivary pH using sensors at multiple sites. The 35th Annual Meeting of the Japanese Academy of Sports Dentistry, Oct 12, 2024, Osaka, Japan
- Aung Thet Khaing, Hiroshi Churei, **Chenyuan Li,** et al. Shock absorption of 3D-printed ABS and fabric for sports faceguard. FDI 2021World Dental Federation, May 2021, Sydney, Australia
- Yumi Takahashi, Hiroshi Churei, **Chenyuan Li,** et al, Application of custom-made faceguard for professional volleyball player after jaw surgery of surgical orthodontic treatment. The 31st Annual Meeting of the Japanese Academy of Sports Dentistry, Hiroshima & Online
- Shintaro Shimizu, **Chenyuan Li**, Toshiaki Ueno et al. Clarifying the Mechanisms of School Sports Accidents Using Text Mining. The 24th Scientific Meeting of the Japanese Association for Dental Science, Online