# CV

## Dengtao Yu

**Senior R&D Engineer | Turbomachinery & Medical Devices**

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## Professional Summary

A highly accomplished Senior Engineer with a Master's in Fluid Mechanics and over seven years of professional experience spanning the medical device and power generation industries. Proven expertise in leading the R&D of complex turbomachinery systems, from micro-scale VAD blood pumps to F-class heavy-duty gas turbines. Expert in the full engineering lifecycle, from advanced simulation and modeling to hands-on experimental validation and on-site testing.

## Professional Experience

### Senior Fluid Engineer | Shanghai Xinhengrui Medical Technology Co., Ltd.

*Oct 2021 – Present*

- Led the complete R&D lifecycle of a catheter-based Ventricular Assist Device (PVAD), covering conceptual design, simulation, prototype development, and experimental validation.

- Developed a predictive hemolysis model using Lagrangian particle tracking to analyze blood cell shear stress, which directly guided the optimization of biocompatible blade design (reducing hemolysis risk by enhancing flow uniformity).

- Designed and commissioned three distinct experimental platforms (hydraulic performance test rig, pulsatile flow simulation rig, hemolysis evaluation rig) fully compliant with ISO 18242 and ISO 14708-5 standards.

### Thermal Performance Engineer | Shanghai Electric Gas Turbine Co., Ltd.

*Jul 2018 – Sep 2021*

- Developed and calibrated a comprehensive thermodynamic model of an F-Class Combined Cycle Power Plant (CCPP) using IPSEpro, achieving a simulation accuracy of $\pm 1.5\%$ compared to on-site operational data.

- Engineered a real-time digital twin for a gas turbine fleet (12+ units), which formed the core of an intelligent O&M platform—enabling predictive fault diagnosis and reducing unplanned downtime by 20%.

- Successfully deployed and validated optimized control strategies during on-site testing at 3 commercial power plants, improving overall cycle efficiency by 0.5% and reducing $NO_x$ emissions by 8%.

# Technical Skills

## Simulation, Modeling & Optimization

- **CFD & Simulation**: ANSYS Fluent & CFX (specialized in turbulent flow, rotating machinery, and blood flow dynamics), Pointwise & ICEM CFD (high-quality mesh generation for complex geometries).

- **Structural Analysis (FEA)**: ANSYS Mechanical (strength verification, fatigue life prediction, vibration modal analysis), Fluid-Structure Interaction (FSI) simulation for turbomachinery and medical devices.

- **System-Level Analysis**: IPSEpro (thermal cycle simulation, system integration, and performance optimization for power plants).

- **Design Optimization**: DesignXplorer (parametric optimization of performance metrics and structural reliability, multi-objective optimization for PVAD and gas turbine components).

## Design, Data & Validation

- **CAD & Turbomachinery Design**: Siemens UG/NX, SolidWorks (3D modeling and detail design), AxSTREAM (end-to-end aerodynamic design for compressors, turbines, and blood pumps).

- **Data & Programming**: Python (NumPy, Pandas), MATLAB & Simulink, C/C++, RUST, InfluxDB (time-series data storage for digital twins).

- **Experimental & Validation**: Test Rig Design & Construction (mechanical structure, fluid circuits, control systems), On-site Power Plant Testing, DAQ Systems, ISO Standards compliance (ISO 18242, 14708-5, ISO 8178).

# Education

## M.S. in Fluid Mechanics | University of Shanghai for Science and Technology

*Sep 2015 – Jul 2018*

## B.S. in Thermal Energy and Power Engineering | University of Shanghai for Science and Technology

*Sep 2011 – Jul 2015*

# Academic Research & Publications

## Key Research

- Led numerical studies on bio-inspired airfoil propulsion using a custom-developed CFD code (UCFD), focusing on unsteady flow control and efficiency enhancement.

- Spearheaded the aerodynamic design of a Supercritical $CO_2$ ($SCO_2$) centripetal compressor, achieving 92% isentropic efficiency in simulations.

## Publications

1. YU, Dengtao, et al. Numerical study of the effect of motion parameters on propulsive efficiency for an oscillating airfoil. Journal of Fluids and Structures, 2017, 68: 245-263.

2. YU, Dengtao, Huang Diangui. Numerical Simulation and Analysis of $SCO_2$ Centrifugal Compressor. Journal of Engineering Thermophysics, 2019, Vol. 40, No. 5: 1025-1030.

3. HSIEH, Yue-Lin, YU, Dengtao, et al. Hydroacoustic sonification and flow pattern investigation of venous pulsatile tinnitus... Sens Mater, 2021, 33: 3439-3457.

4. DU, Xuefei, YU, Dengtao, et al. Supercritical carbon dioxide centripetal compressor— aerodynamic design and analysis of off design conditions. Journal of Nuclear Engineering and Radiation Science, 2019, 5.4.

5. HSIEH, Yue-Lin, YU, Dengtao, et al. Validation of computational fluid dynamics simulation methods for venous pulsatile tinnitus. Modern Physics Letters B , 2021, 35.36: 2150522.

## Patents

| No. | Patent Title | Applicant Location | Patent No. | Publication Date |
|---|---|---|---|---|
| 1 | A Blood Pump with a Fairing and a Ventricular Assist Device | Shanghai, China | CN202210306127.0 | Oct 03, 2023 |
| 2 | Blood Pump Outlet Assembly and Blood Pump Device | Shanghai, China | CN202320909524.7 | Sep 01, 2023 |
| 3 | Pump Rotor, Blood Pump, and Ventricular Assist Device | Shanghai, China | CN202111564648.8 | Jun 23, 2023 |
| 4 | Centrifugal Blood Pump | Shanghai, China | CN202221626208.0 | Feb 10, 2023 |
| 5 | Gas Turbine Performance Prediction Method, Device, Storage Medium, and System | Shanghai, China | CN202111626216.5 | Mar 01, 2022 |