

Che-Hao Yang

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Research Interests: Manufacturing processes; Additive manufacturing; Biomedical manufacturing; Mechanical design; Thermal-fluid science

A. EDUCATION

08/2015-05/2019	Ph.D. in Mechanical Engineering	Washington State University, Pullman, WA
08/2013-08/2015	M.S. in Mechanical Engineering	University of North Dakota, Grand Forks, ND
05/2010-05/2014	B.S. in Mechanical Engineering	University of North Dakota, Grand Forks, ND

B. APPOINTMENTS

08/2019-present	Faculty Instructor of Mechanical Engineering, Washington State University, Tri-Cities <ul style="list-style-type: none">Instructing Engineering Computer-Aided Design and Visualization, Integrated CAD Design, Manufacturing Processes, Mechanical Design, Engineering Analysis, Experimental Design and Senior Capstone Design Projects
05/2019-08/2019	Postdoctoral Research Fellow of Chemistry, Washington State University <ul style="list-style-type: none">Designed and fabricated an ultra-vacuum chamber system under cold and hot air environment conducting Scanning Tunneling Microscope (STM) studiesDesigned Rotating machinery system for research accuracy, temporal and spatial freedom, and cost control
01/2016-05/2019	Research Assistant of Mechanical Engineering, Washington State University <ul style="list-style-type: none">Designed and fabricated electrosurgical devices in minimally invasive process for heat transfer and thermal behavior studiesDeveloped an automatic surgical mechanism with software programming for surgical quality control by limiting heat generation/ heat energy supplyHands-on experience in biomechatronic devices system design for reaching commercial surgical criteriaCoordinated cross-function teamwork for clinical validation of the thermal injury occurred in the surgical process (histological analysis)Conducted design of biopsy needle, ankle-foot orthosis, and thermal science with additive manufacturingAuthor publications about research findingsCommunicating with other departments to plan collaborative projectsTraining and guiding new students for qualifying the lab works
01/2017-5/2019	Graduate Student Instructor (Teaching Assistant) of Mechanical Engineering, Washington State University <ul style="list-style-type: none">ME 304 Heat Transfer, ME 405 Thermal Systems Design, ME 415 Engineering Design, ME 416 Mechanical Systems Design
08/2013-05/2015	Research Assistant of Mechanical Engineering, University of North Dakota

- Develop the two-phase flow (pure water and nitrogen) system with sudden contraction or expansion pipe
- Investigate and analyze the behavior of the laminar and turbulent flow encountering the sudden changing area
- Design **rack and pinion system** (gearbox) for FSAE competition
- Develop a powered clutch compressor utilize **gears and bearings mechanism**

08/2013-05/2015 **Teaching Assistant** of Mechanical Engineering, University of North Dakota

- ME 101 Introduction to Mechanical Engineering, ME 322 Design of Machinery, ME 341 Thermodynamics, ME 370 Engineering Disasters and Ethics

06/2013-08/2013 **ASUSTeK Computer Inc** (Mechanical Designer [Internship]), Taipei, Taiwan

- Designed laptop case and frame
- Improved and arranged internal configuration with 3-D modeling for **plastic casting process**
- Examined the quality of the design with **six sigma**

C. PUBLICATIONS

- **C.-H. Yang**, W. Li, and R. K.-R. Chen, “Determination of Tissue Thermal Conductivity as a Function of Thermal Dose and Its Application in Finite Element Modeling of Electrosurgical Vessel Sealing,” *IEEE Trans. Biomed. Eng.*, pp. 1–1, 2020, doi: 10.1109/TBME.2020.2972465.
- X. Li, **C.-H. Yang**, R. K. Chen, and W. Li, “Dynamic Impedance Monitoring for Large Diameter Vessel Sealing Using Bipolar Electrosurgery,” *ASME. J. Med. Devices*. June 2020; 14(2): 021006, doi: 10.1115/1.4046653
- **C.-H. Yang**, W. Li, and R. K. Chen, “Characterization of the Electrosurgical Tissue Joining Process Using Dynamic Impedance and Energy Efficiency,” *J. Manuf. Sci. Eng.*, vol. 141, no. 5, May 2019, doi: 10.1115/1.4043267.
- **C.-H. Yang**, M. Amer, W. Li, and R. K. Chen, “A New Concept of Electrosurgical Tissue Joining Process Using Sequential Compression for Minimal Thermal Damage,” presented at the ASME 2019 14th International Manufacturing Science and Engineering Conference, 2019, doi: 10.1115/MSEC2019-2946.
- X. Li, **C.-H. Yang**, R. K. Chen, and W. Li, “Dynamic Impedance Monitoring of Large Diameter-Vessel Sealing in Bipolar Electrosurgeries,” presented at the ASME 2019 14th International Manufacturing Science and Engineering Conference, 2019, doi: 10.1115/MSEC2019-3033.
- **C.-H. Yang**, W. Li, and R. K. Chen, “Characterization and Modeling of Tissue Thermal Conductivity During an Electrosurgical Joining Process,” *IEEE Trans. Biomed. Eng.*, vol. 65, no. 2, pp. 365–370, Feb. 2018, doi: 10.1109/TBME.2017.2770095.
- **C.-H. Yang**, R. K. Chen, S. Phillips, J. Ramsay, and W. Li, “Experimental Study on the Electrosurgical Tissue Joining Process With Process Parameter Monitoring for Quality Control,” presented at the ASME 2018 13th International Manufacturing Science and Engineering Conference, 2018, doi: 10.1115/MSEC2018-6637.
- A. Kotwal, **C.-H. Yang**, and C. Tang, “Two-Phase Flow Behavior in Channels with Sudden Area Change Using Experimental and Computational Approach,” presented at the ASME 2017 International Mechanical Engineering Congress and Exposition, 2018, doi: 10.1115/IMECE2017-71085.
- **C.-H. Yang**, S. Kaonis, R. K. Chen, and W. Li, “Measurement of Tissue Thermal Conductivity with Variable Thermal Dose During an Electrosurgical Joining Process,” presented at the ASME 2017 12th International Manufacturing Science and Engineering Conference collocated with the JSME/ASME 2017 6th International Conference on Materials and Processing, 2017, doi: 10.1115/MSEC2017-2944.
- **C.-H. Yang**, Y. Liu, W. Li, and R. K. Chen, “Characterization of Tissue Thermal Conductivity During a Tissue Joining Process,” presented at the ASME 2016 International Mechanical Engineering Congress and Exposition, 2017, doi: 10.1115/IMECE2016-66932.
- **C.-H. Yang**, “Two-Phase Flow Pressure Drop in Circular Small Channels with Abrupt Contraction and Expansion,” *Theses Diss.*, Jan. 2015.

D. DISCLOSURE PATENT

- Vessel Sealer Using Sequential Compression (Washington State University Disclosure-19-00056)

E. PRESENTATIONS

- “Manufacturing Science and Engineering Conference” *Texas A&M University*, College Station, TX, 2018.
- “Manufacturing Science and Engineering Conference” *University of Southern California*, Los Angeles, CA, 2017.

F. HONORS

01/2016-2019	Graduate Research and Teaching Assistantship	Washington State University, Pullman, WA
06/2018	Travel Grant for 2018 MSEC & NAMRC Conferences in College Station, TX	National Science Foundation (NSF)
06/2017	Travel Grant for 2017 MSEC & NAMRC Conferences in Los Angeles, CA	National Science Foundation (NSF)
06/2017	The Graduate and Professional Students Association (GPSA) Travel Grant	Washington State University, Pullman, WA
01/2014-2015	Graduate Research and Teaching Assistantship	University of North Dakota, Grand Forks, ND
01/2011-2013	International Undergrad. Student Tuition Waiver	University of North Dakota, Grand Forks, ND

G. PROFESSIONAL CERTIFICATION AND MEMBERSHIP

12/2013	Fundamentals of Engineering Certification
2020-present	American Society of Mechanical Engineers (ASME) Membership
2017-2019	Society of Manufacturing Engineers (SME) Membership
2013-2014	Society of Automotive Engineers (SAE) Membership

H. PROFESSIONAL COMPETENCIES

- Expert in **mechanical system design**, mechatronics system design, motion system design and test, and mechanical modeling software such as **SolidWorks**, PTC Creo Elements/Pro, and AutoCAD
- Expert in **manufacturing processes**, milling, turning, laser machining, welding, and 3D printing
- Expert in Multiphysics system modeling by using COMSOL Multiphysics
- Expert in FEM analysis by using Abaqus and **ANSYS**
- Expert in mathematics software such as **MATLAB**
- Experienced in mechatronics and control software **LabVIEW**
- Familiar with project management, and Six Sigma

I. SERVICE AND SYNERGISTIC ACTIVITIES

- Co-session organizer for 2018 ASME Manufacturing Science and Engineering Conference
- Co-organizer from 2016- 2018 Experience 3D Printing Event in Palouse Discovery Science Center
- Co-organizer for 2019 ASME Yesterday, Today, and Tomorrow event in ASME COLUMBIA BASIN SECTION (CBS)
- Ad-hoc reviewer: *Heat Transfer Engineering Journal*, **Taylor & Francis**
- Served as a paper reviewer: Biomedical Engineering/Biomedizinische Technik (BMT); Manufacturing Science and Engineering Conference (MSEC)

J. CURRENT AND PRIOR SUPPORT

Awards	Period	Amount
NSF CMMI - 1434665	9/1/2014-8/31/2017	\$159,969 (UM) \$146,959 (UT)

“Collaborative Research: Understanding Dynamic Behaviors of Tissue Welding for High Quality Electrosurgical Tissue Joints” (PhD Dissertation)

The goals are to understand how thermal does change the tissue properties during electrosurgical tissue joining process and to optimize the joining process

Blue Cross Blue Shield of Michigan (BCBSM) Foundation	1/1/2015-12/31/2015	\$75,000
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“Clinical Evaluation: 3D Printing of Ankle-Foot Orthosis with Optimal Design for Rapid Fabrication” (Participant)

The goal is to evaluate the performance of 3D printed ankle-foot orthosis with advanced structural design that allows patients to receive their custom orthoses in one clinic visit.

Topics

“Additive Manufacturing of Overhang Structures Using Moisture-Cured Silicone with Support Material.” (Participant)

My tasks were to develop an automatic extrusion system and perform experiments for validation.

“3D Printing Filament Deposit Strength with Heating Laser Power.”

My tasks were to establish a thermal measurement system and experimentally record the temperature response while laser line activated on the deposited materials.

“Additive Manufacturing of Overhang Structures Using Moisture-Cured Silicone with Support Material.” (Participant)

My tasks were to develop an automatic extrusion system and perform experiments for validation.

“Development and Validation of A 3D Printing Complex Biopsy Inner Feature.” (Participant)

My tasks were to build a force measurement system in the project for observing a dynamic force.