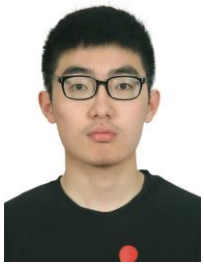
# *Huacheng Zhang*

## Personal Information



**Name** Huacheng Zhang
**Date of birth** 01/26/1995
**Gender** Male
**Citizenship** Chinese

## Education

Ph.D. Student of Mechanical Engineering **10/2020 – Present**
Department of Mechanical Engineering, Kyushu University, Japan

Huawei Technologies Co., Ltd. **10/2019 – 10/2020**
Department of Thermal Engineering, 2012 Labs, China

Master of Mechanical Engineering **10/2017 - 10/2019**
Department of Mechanical Engineering, Kyushu University, Japan

Bachelor of Mechanical Engineering and Automation
College of Mechanical and Electrical Engineering, Beijing University of Chemical Technology, China **09/2012 - 06/2016**

## Research Interests

Annular Two-phase flow; Disturbance wave; Drop evaporation.

## Research Experience

### Investigation of film thickness and disturbance wave characteristics in vertical gas-liquid two-phase flows

**04/2020 – 10/2019**

In this study, experiments are carried out to study the characteristics of the liquid film thickness under BWR operating condition. Instead of using steam and water under BWR operating conditions (7MPa, 285 °C), we used HFC134a gas and liquid ethanol as working fluid under atmospheric condition (0.7 MPa, 40 °C), and the fluid properties are similar under these two conditions. We observed the disturbance waves in the HFC134a gas – ethanol system. After data analyzing, we found the film thickness collapse onto a single curve when plotted as functions of Weber number for all considered systems (N2 – water, HFC134a – water, and HFC134a – ethanol systems). This indicates the effect of surface tension and the viscosity of the liquid on disturbance wave flow. Furthermore, a simple model

of the height of a disturbance wave was proposed. According to the model, the Weber number is a dominant parameter in the determination of the height of disturbance waves.

Supervisor: Prof. Shoji Mori

## Wettability effects on Marangoni flows in water drops

**04/2018 - 10/2019**

In the apparatus of Infrared Camera, the experiments of sessile drops evaporating on localised heated rough aluminum surfaces were conducted. A Matlab program was built to extract the temperature gradient of drop surface from the Infrared video and analyze the thermocapillary convections of drop surfaces. We report a systematic study of the role of Marangoni convections in the evaporating kinetics of pure waterdrops, considering the heating regime and surface wettability. A strong correlation between temperature difference within the drop and the evolution of the drop shape during different modes of evaporation was observed. Heating position and surface wettability were found to play a role in both the emergence of the Maranoni flows and the evaporation kinetics.

Supervisor: Prof. Yasuyuki Takata

## Evaporation kinetics of water drops on surfaces with different surface roughness

**10/2017 - 04/2018**

In this research, we conducted a series of experiments to understand how the evaporation and motion of drops are influenced by the wetting mode of rough hot-spots. We fabricated three different surfaces exhibiting full (Wenzel) or partial (Cassie – Baxter) wetting and the hot-spot is imposed by laser irradiation. With the help of CCD camera and Infrared camera, the evolution of drops shape and three phase contact line motion were recorded. Through energy analysis of drops, the evaporation mechanism and the motion of three phase contact line were demonstrated. A direct link between drop motion and wetting mode was found. In particular, drops evaporating on hot-spots were found to be more mobile due to the extra energy provided by heating, which allows to overcome even the stronger pinning on the surface exhibiting Wenzel wetting mode.

Supervisor: Prof. Yasuyuki Takata