

SPRING 2022

**UNDERGRADUATE
RESEARCH SYMPOSIUM
WINNERS**

Most Popular Project

Classification Theorem of Closed Surfaces

Presenters: Sicheng Xing and Weilun Wang

Faculty Mentor: Shengkui Ye

Our research orientated from the classical problem to classify surfaces. We use a classical classification theorem to solve a weaker version of this problem. Namely, classify 2-dimension manifolds into two categories: Orientable Surface and Non-orientable surfaces.

SPRING 2022

STEM

Best STEM Research Project & Presentation

A First-Principle Investigation of the Optical Properties for a Single Sessile Liquid Lens Formed by the Surface Tension and Gravitational Effects Between Water and Air

Presenter: Yifan Bu

Faculty Mentor: Jun Zhang

Liquid lens is an emerging technology that can alter its focal length by changing its surface curvature, which could be used to replace the bulky mechanical structure of the zoom and focal modules in the traditional solid-state imaging system. The potential application of liquid lens technology is mainly compact optical systems, such as smartphones or CCTV system. In this project, the optical performance of a multi-curved liquid lens system will be investigated theoretically, numerically and experimentally. First-order aberrations such as spherical aberration and chromatic dispersion could be analyzed by expressing the surface curvature and simulating in optical imaging algorithm.

SPRING 2022

SOCIAL SCIENCE

Best Social Science Research Project & Presentation

Factors Influencing Stay/Leave Decisions of Female Victims of Intimate Partner Violence (IPV) in China

Presenters: Yining Wei and Yiyue Wang

Faculty Mentor: Pekka Santtila

Intimate partner violence is a major public health issue. Some women choose to stay in the violent relationship. Both psychological impact of violence, such as learned helplessness, and rational consideration of objective factors, such as economic resources, have been suggested as explanations. We investigated the influence of violence on Chinese women's perception of their ability to leave the relationship. We found out that first, women relatively underestimated their ability to leave more when they have undergone more domestic violence and have a lower sense of control. Second, the experience of past violent intimate relationships predicts the violence of the current one.