# Spring 2025 Open Research and Creative Activities Forum (ORCA)

**Location: Orbach Science Library 122 & Online via Zoom**

**Date & Time: May 9 th; 2pm-3:30pm**

**About the Forum**

The **Open Research and Creative Activities Forum (ORCA)** is a quarterly event hosted by the Research Services Department at the Orbach Science Library. It celebrates outstanding student projects from across all disciplines and academic levels, with a special focus on **interdisciplinary work and open scholarship**.

Each quarter, **finalists** will be invited to present their research or creative work at Orbach 122. Presentations also highlight how project artifacts—such as code, documentation, data, or multimedia—have been, or will be, shared through an **open access repository**.

Participants are encouraged to review the evaluation **Rubric** to understand the selection criteria and expectations for presentations.

**Program Details**

**Nicolas Valdivia Hennig**

Hispanic Studies

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**#1 Project Title:**

Research-Creation using Open-Source Tools: Playing the Archive in Hawk and Puma

**Project Summary**

Hawk and Puma is a minimalist pixel-art video game developed using open-source tools like Bitsy as part of a doctoral research-creation process. The game reimagines "El Primer Nueva Corónica y Buen Gobierno", a 400-year-old illustrated manuscript written by Felipe Guaman Poma de Ayala—an Indigenous Andean chronicler who denounced colonial violence in 17th-century Peru. This project bridges creative technology, archival research, and community collaboration to explore how digital storytelling can function as both scholarly inquiry and cultural preservation. The game was designed to function as a playable archive: a digital environment where players can engage with Guaman Poma's ideas through movement, interactivity, and reflection. Pixel art inspired by his original ink illustrations, combined with an ambient Andean-influenced soundtrack, help immerse players in a stylized but critical interpretation of the manuscript. Beyond the game itself, this project sparked the creation of Andean Futures, a community-based initiative in collaboration with members of the ÑawpaÑan community in the Sacred Valley of the Incas. Through this partnership, Indigenous and local youth are now using open-source tools to design their own games, contributing to cultural sustainability and digital sovereignty.

**Short Bio**

Nico Valdivia Hennig (they/he) is an award-winning Chilean game designer, ludic activist, and cultural studies researcher with over a decade of experience in game design. They are a PhD candidate in Hispanic Studies at the University of California, Riverside, with a Designated Emphasis in Speculative Fiction. Their research focuses on ludic activism, game design, and indigenous game production in Latin America. Nico co-founded Niebla Games, which has released both board and video games for PC and mobile platforms. In 2022, their studio was selected for Google's Indie Games Accelerator program. Notable accolades include "Best Game

Design" at EVA Córdoba 2019 in Argentina, and recent nominations for the Explorer Award at AMaze/Berlin Festival 2024 and Best Social Matters Game and Best Diversity Game at BIG Festival/Gamescom Latam 2024 in São Paulo, Brazil. Nico has extensive experience lecturing on game design and narrative within Chilean game development programs.

**Chujing Zheng**

Chemical and Environmental Engineering

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**#2 Project Title**

Anime Meets Antibiotics: A Visual Guide to Bacterial Resistance

**Project Summary**

This project explores how environmental stressors in soil—such as nutrient limitation and pH changes—influence the microbial competition between antibiotic-resistant bacteria (superbugs) and beneficial bacteria. To communicate these complex microbial interactions beyond the lab, I transformed my experimental system into an anime-style visual narrative. Each bacterial group and environmental condition is represented by a character in a microbial “battlefield,” making the invisible dynamics of resistance more relatable. The complete project—including slides, character artwork, and a README file—was created with the help of ChatGPT and is shared openly through a digital repository to support science communication and creative open scholarship.

**Short Bio**

Chujing Zheng is a fourth-year Ph.D. candidate in Chemical and Environmental Engineering at UC Riverside. Her research focuses on how environmental conditions shape the fate of antibiotic-resistant bacteria in water–soil–plant systems. She is passionate about combining

storytelling, art, and open science to make these little bugs more visible and engaging to broader audiences.

**Angeliz Vargas Casillas**

Mathematics

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**#3 Project Title**

When math meets your skin: A multiscale model of keloid scar expansion

**Project Summary**

I created a computer-based mathematical model to better understand the cell interactions that govern keloid scar expansion.

**Short Bio**

I am a PhD candidate in the mathematics department, working with Dr. Qixuan Wang from UCR and our collaborators from UCI Dr. Maksim Plikus and Dr. Yingzi Liu. I expect to graduate in March 2026 and my goal is to go into industry and continue skin research. However, I am open to other research opportunities!

**Mst Shamima Hossain**

Computer Science and Engineering

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**#4 Project Title**

Electronic Bee-Veterinarian: Safeguarding Honeybees Through Technology

**Project Summary:**

Without honeybees, humanity will suffer. These pollinators are responsible for one-third of our food supply, yet commercial beekeeping suffered a catastrophic 62% decline in the past year.

Beekeepers face challenges in preserving honeybee colonies due to (i) a lack of robust and reliable remote hive monitoring system, (ii) manual, ill-managed, and sometimes harmful in-hive climate control during extreme weather conditions and (iii) no stressor identification of deteriorating hive condition without scheduled human inspection and delayed actions. My research focuses on addressing these challenges by proposing (i) temperature-based efficient inspection scheduling of with an explainable real-time hive health monitoring, forecasting, and alerting method, (ii) an economically sustainable autonomated control system of the in-hive microclimate, and (iii) a system to identify stressors and recommend actions accordingly.

**Short Bio**

Mst Shamima Hossain is a PhD candidate at the University of California, Riverside (UCR), supervised by Prof Hyoseung Kim and Prof Vassilis Tsotras. Her research focuses on the intersection of cyber-physical systems (CPS) and data mining to model, analyze, and control CPS and enhance system adaptability in real-world environments. Her current work applies this approach to agricultural systems, specifically beekeeping and pollinator preservation

**Wenxin Tang**

Creative Writing

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**#5 Project Title**

3D Visual Poetry

**Project Summary**

In the recent exhibition of UCR ARTS photography museum, poetry has appeared in photography as a 2D experience. With this project, I intend to introduce visual poetry to our

environment as a 3D experience, by inserting written poems into a 3D scanned environment and objects, and then 3D print the installation for the audience to engage.

**Short Bio**

Wenxin Tang is an incoming MFA student in Creative Writing at UCR.

**Etienne Ortega**

Political Science

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**#6 Project Title**

Population-Weighted Statistics Symbology from ArcGIS Pro

**Project Summary**

The environment shapes our economy and our politics, and our current industries and our policies are shaping our environment and warming our planet. To aid the quantitative study of human-environment relations, we have created a dataset of simplified geographic and climate statistics, averaged at the country and at the administrative subdivision basis for the years 1975-2020, divided into 5-year intervals. The variables include population density, elevation, inclination, distance to coast, distance to water body connected to ocean, air quality, precipitation, heating degree days, cooling degree days, vulnerability to hurricanes, and vulnerability to earthquakes. Considering that population-weighted average represent how people experience these variables better than their unweighted counterparts, we also present population-weighted averages of these variables using 10×10km, 1×1km, and 150×150m subareas. Finally, we conduct a panel data time-series regression to analyze how these variables correlate with economic factors such as population, life expectancy, and GDP. Further research

can utilize this dataset to analyze how geography has shaped policy, and how policy has affected that region's environment.

**Short Bio**

Etienne Ortega is a first-year Ph.D. student in Political Science at UCR.