



# NCUR 2021 Proceedings

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## **Bypassing the Malting Process with Koji**

Chemistry - Time: Tue 3:30pm-4:30pm - Session Number: 710

Tom Williams, Dr. Brett Taubman, A.R. Smith Department of Chemistry and Fermentation Sciences, Appalachian State University, 287 Rivers St, Boone, NC 28608

Tom Williams

Barley is an important ingredient in the production of beer and other grained-based beverages, contributing fermentable sugars, flavor, and aroma. For barley to be of use in the brewing process, enzymes that break down starches in grain must be accessible in order to develop a medium that yeast can ferment. These enzymes are activated via the malting process, which takes between 9-11 days, and consumes up to 1,140 gallons of water and 800kWh of energy on an industrial scale. *Aspergillus oryzae* is a filamentous fungi used in the production of many Asian foods and beverages where it is used to saccharify a host of substrates. In addition to enzyme production, it yields unique flavors and aromas not found in traditional malted barley. The goal of this research was to determine if *A. oryzae*, commonly referred to as Koji, can be used on unmalted barley to bypass the malting process and produce fermented beverages comparable to those that use malted barley. This research also set out to quantify and characterize the organoleptic and sensory characteristics in a beverage produced using Koji barley. It was predicted that Koji barley would produce an appreciable level of enzyme activity as well as a host of sensory characteristics. To test this, pearled barley was inoculated with different strains of *A. oryzae* and saccharified using a mash test to determine its yield of enzymes and soluble sugars in beer wort. This wort was fermented with standard brewer's yeast and its attenuation and ethanol content were quantified. The presence of organic acids and other compounds in the fermented wort were then quantified using HPLC. Finally, a sensory analysis was conducted to characterize its flavors and aromas. The results supported the prediction and demonstrated new potential applications for Koji barley in the brewing industry.

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## **Climate Through the Prism of Covid: Lessons on Structural Vulnerability and Resilience in the Food, Health, and Social Service Sectors**

Interdisciplinary Studies - Time: Tue 5:00pm-6:00pm - Session Number: 833

*Brian Burke, Rich Rheingans, Aniseh Bro, Jason Snyder, Aidan Malone, Jess McClelland. Sustainable Development department, Appalachian State University. 287 Rivers St, Boone, NC 28608*

Aidan Malone, Jess McClelland - [mcclellandjr@appstate.edu](mailto:mcclellandjr@appstate.edu)

The COVID-19 pandemic has emphasized how global disruptions can cause vulnerabilities among local populations in the High Country region of Western North Carolina. Similar to climate change the COVID-19 pandemic is multidimensional, dynamic, and involves significant uncertainties, which presents a window into the structural vulnerabilities and institutional responses may accompany these crises. In the paper we study effective responses to the COVID-19 pandemic in social service, health, and food systems in Western North Carolina that have been impacted by Covid-19 and the challenges they faced, to integrate sustainability objectives with widespread systemic adaptations. To do this we (1) examine how social service, health, and food systems in Western North Carolina have been impacted by Covid-19, (2) develop a typology of organizational responses, and (3) identify areas of vulnerability, sources of resilience, and effective adaptations for local communities in Western, NC. The key informants represented various food, social and health sector organizations along with focus groups of highly vulnerable community members which shared their perceptions, decision making and adaptations during the COVID-19 pandemic. Interviews and focus group data were transcribed and hand coded based on a priori and emergent themes. Various system maps were constructed based on interview narratives, identifying the key actors shaping organizations' work and the relationships among them. Data collected from this study can be utilized to establish a new model for university-community relations that is tailored to the increasingly precarious conditions of the 21st century and the turbulent decision-making context. This research aims to identify characteristics of short-term adaptation to the COVID-19 pandemic in the local community, while there may be considerable changes and stressors maintaining aspects of these adaptive responses in the long term.

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## **Combating Food Insecurity in Women and Children in the Appalachian Region**

Global Health - Time: Tue 3:30pm-4:30pm - Session Number: 5088

*Gracyn Travitz, Emma Swartz / Adam Hege/ Public Health / Appalachian State University / 1179 State Farm Rd, Boone, NC 28607*

Gracyn Travitz, Emma Swartz

**Background:** In the Appalachian region, food insecurity is an issue that plagues many of its people. The region, largely rural, often has limited funding for resources, education, and food options; therefore, many suffer at the hand of unhealthy food accessibility.

**Methods:** A systematic literature review of peer-reviewed articles was conducted from 2005- 2020 concentrating on food insecurity in the Appalachian region, with a focus on women and children. Utilizing Google Scholar as our primary search engine and the search terms Appalachian and food insecurity, 581 articles were initially identified. We next narrowed our search to 117 articles that emphasized women and children. We finalized our review of the 117 articles to identify ones that provide specific intervention and policy strategies.

**Results:** Our review found that across the published research, the Appalachia region experiences significant food insecurity challenges for women and children. Fortunately, there are several federal programs that can be and are utilized as leverage for intervention and policy response. Some of the largest, most influential programs include: Special Supplemental Nutrition program for Women, Infants and Children (WIC); Supplemental Nutrition Assistance Program (SNAP); and the Farm Bill. SNAP is the most far-reaching. WIC is most specialized for women and children. The Farm Bill focuses on specific populations in need. Medical providers and public health officials also play a huge role in combating food insecurity among women and children in Appalachia.

**Discussion:** Maternal and child nutrition is an aspect that is overlooked. However, it's vital that this vulnerable population receives proper attention. Due to rural circumstances, women are restricted on providing necessary and healthy nutrients to their children. Without proper nutrition, growth and development for infants is impaired. Implementing evidence-based interventions and policy strategies in rural Appalachia can sustainably improve the health outcomes of women and children across their lifespans.

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## **Covid-19 Preventative Airport Terminal**

Architecture & Interior Design - Time: Mon 1:30pm-2:30pm - Session Number: 2053

*Kelsi Kanoy, Chelsea Helms, Department of Applied Design, Appalachian State University, 287 Rivers Street, Boone, NC 28608*

Kelsi Kanoy

At its worst, the aviation industry was projected to have lost about 90% of its annual revenue as a direct result of COVID-19. This pandemic has drastically changed the dynamic of air transportation. Traveling for business and leisure are a thing of the past. Now, travel is only out of necessity. This study explores possible design solutions that rethink airport terminals' ability to prevent the spread of COVID-19 while simultaneously providing a familiar, comforting, and safe travel experience. The end goal is to encourage airline travel once again. Not only does this study provide a possible solution to the travel limitations, it also creates a uniform way to fight disease transmission in airports worldwide and combats the feelings of fear and anxiety many travelers are concerned by. Comparative research strategies were utilized to gather the information in this study. A collection of scholarly articles about airport design, COVID-19 transmission, indoor air quality, health and safety signage, biophilic design, universal design, and general wellness in relation to the built environment were all analyzed for the purpose of this study. There is a critical need to redesign our airport terminals not only to promote air travel, but also to ensure the safety of the experience. In conclusion, the goal is to create an airport design that utilizes innovative solutions to prevent the spread of the COVID-19 virus while also creating an environment that encourages connectivity, productivity, and reduces stress in travelers.

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## **Impacts of Food Insecurity on School-Aged Chinese Children**

Global Health - Time: Tue 3:30pm-4:30pm - Session Number: 5087

*Gracyn Travitz / Adam Hege / Public Health / Appalachian State University / 1179 State Farm Rd, Boone, NC 28607*

Gracyn Travitz

**Purpose:** This research aims to explore the influence of food insecurity on school-aged children in China. The numerous impacts of food insecurity coinciding with a Chinese child's life will be discussed, and attention will be directed at populations with increased risk. Lastly, this research aims to offer unique perspectives on the present issues, make future suggestions, inform intervention/policy solutions, and discuss the impact and significance of disparities due to the global COVID-19 pandemic.

**Methods:** An exhaustive systematic literature review of peer-reviewed articles is being conducted. Key words and phrases such as, "food insecurity" and "Chinese children" are being utilized in search engines, such as Google Scholar and JSTOR. 8,280,000 articles were identified initially, and then narrowed into key search terms to target specific aspects of the topic. This includes primary locations of food insecurity in China, aspects of children's growth and development impacted by food insecurity, the prevalence of food insecurity in China, and specific vulnerable groups of school-aged children.

**Results:** Currently final results are pending the literature review but will be available for the 2021 National Conference on Undergraduate Research.

**Discussion:** Based on preliminary results, published research shows the impact of food insecurity is significant on Chinese children and the country as a whole. Specifically, mental health and elementary students' academic performance are negatively impacted by malnutrition. Left-behind-children (LBC), whose parents must migrate to work and leave children to support themselves, are an emerging group. To prevent the country from complete environmental degradation, China is relying on self-sufficiency efforts and increased imports. Lastly, in desperate attempts to supply adequate food, China is turning towards policy solutions. Without focused intervention and research efforts, China will continue in a downward spiral where children go hungry, mental health worsens, disparity is widened, trust will falter, and the environment is degraded.

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## **Land Ownership in Western North Carolina: Exploring the Relationship between Absentee Ownership and Social Vulnerability**

Geography/Geology - Time: Tue 11:00am-12:00pm - Session Number: 420

*Jessica McClelland, Lauren Andersen, Department of Planning and Geography, Appalachian State University 287 Rivers St, Boone, NC 28608*

Jessica McClelland

Appalachia has a history of poverty and increased social vulnerability due to long standing economic and social practices in the region. Modern development patterns in the greater Appalachian region create the unique conditions for gentrification and the continued reliance on external sources of revenue based on a history of extractive land management and stunted development in terms of traditional capitalist growth. Absentee home and land ownership are continuations of these trends, supporting rural gentrification as a result of a historical dependence on external sources of revenue. The objectives of the proposed study are to 1) assess spatial trends in absentee home ownership in Western North Carolina (WNC), and 2) determine if and how absentee ownership contributes to vulnerability in communities across WNC. Geographic Information Systems (GIS)-based methods will be used to explore the relationship between absentee land ownership and vulnerability indicators across the 27 counties in WNC. Through spatial and statistical analysis of the relationship between land ownership and socioeconomic indicators in WNC, this study will contribute to the body of knowledge surrounding vulnerability in a unique yet understudied region. Based on preliminary research and findings, the

authors hypothesize that areas with high levels of absentee property ownership will also demonstrate higher levels of social vulnerability. The findings from this study can be employed for the purpose of better understanding, managing, and changing development trends towards more place-based, community-oriented development.

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## **Re-envisioning a Residential Eating Disorder Treatment Center**

Architecture & Interior Design - Time: Mon 1:30pm-2:30pm - Session Number: 2052

*Elizabeth Gibson, Chelsea Helms, Department of Applied Design, Appalachian State University, 287 Rivers St., Boone, NC 28608*

Elizabeth Gibson

Among U.S. adults 18 and older who sought out treatment for both an eating disorder and an additional illness included 33.8% of respondents with anorexia nervosa, 43.2% with bulimia nervosa, and 43.6% with binge eating disorder. There is plenty of evidence to demonstrate that these diseases are not exclusive to those under the age of 18. Rather than growing out of eating disorders, many people with this disease continue to live with this condition from adolescence all the way into late adulthood. It is important for adolescents and for adults to seek or continue treatment. Many comments from physicians tell patients that they should have “grown out of” eating disorders in which those sorts of comments lead people to not reach out for the treatment they deserve. The purpose of this project is to re-envision a residential eating disorder treatment center for adults over the age of 18 that provides housing, various levels of treatment, mental and physical (individual and group) therapy, meal support, and overall wellbeing healing in Columbia, South Carolina.

This research is relevant today because there are not many residential treatment centers in the South Eastern area that are catered towards adults over the age of 18. Moreover, those who are unable to have funding for the treatment are having to spend more expenses for traveling far distances to receive treatment (which may reduce the likelihood that they seek treatment).

The research will be explored through the problem-solving means of mindfulness, holistic healing approaches, lighting techniques, and water features to promote calmness, and spaces to have users feel

relaxed while also motivating and encouraging.

While conducting this research, I expect to learn innovative ways to provide an interior environment that will allow the user to feel mentally and physically safe and foster recovery.

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## **The effect of pandemic precautions on NFL ticket consumption**

Economics - Time: Tue 12:30pm-1:30pm - Session Number: 4130

*Caleb Garbuio & Dr. John Whitehead, Department of Economics, Appalachian State University, Boone, NC, 28608*

Caleb Garbuio

The existing literature regarding the COVID-19 economic impact on professional sports is in its infancy. The purpose of this paper is to explore the effect of COVID-19 precautions on NFL ticket demand across five cities: Dallas, Miami, Los Angeles, New York, and San Francisco. We utilize data from an online survey that elicited self-reported willingness of surveyed respondents to attend games depending

on mask and distancing guidelines. We examine the effects income, price, stadium capacity, and mask requirements have on game attendance and consumer surplus. Based on survey results, mask mandates have the highest impact for determining attendance and result in higher consumer surplus. Stadiums that increase their capacity and ticket price saw a decrease in consumer surplus and attendance, while higher consumer income results in greater attendance. I apply this model assess the effect that social distancing guidelines and mask requirement have on attendance and consumer surplus for Dallas and Miami's existing fan attendance policies.

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