

# **UNBC Research Week**

**Friday, March 4<sup>th</sup>, 2022**

**9:00am–9:30am**

## **Tri-Agency Grant Applications from the Committee Perspective**

*Dr. Brian Menounos, Professor, Geography and Canada Research Chair in Glacier Change*

*Dr. Jacqueline Holler, Associate Professor, History/ Women's and Gender Studies*

**Zoom link:**

**<https://unbc.zoom.us/j/64933057119?pwd=eUdzM0wrOVhrYXIJenM0bm95UlI2dz09>**

**Passcode: 713805**

This session features Dr. Brian Menounos and Dr. Jacqueline Holler, selection committee members for NSERC and SSHRC grants, respectively. They will share insights about the review process and lessons that they have learned from serving in these roles. If you plan to apply for an NSERC or SSHRC grant in the future, you won't want to miss this valuable session for tips that can help your application stand out and get funded!

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**9:30am–10:30am**

## **Presentations – Voluntary carbon disclosures, Trump presidency, and BC tourism**

**In-person: Conference Centre 6-205 \*Masks must be worn as per PHO and UNBC policy**

**Online: <https://unbc.zoom.us/j/65096228611?pwd=SDNtVklzN01nZ2FsMXBVA3VTUVFUQT09>**

**Passcode: 170308**

## **Voluntary Carbon Disclosures – A Prerequisite to Environmental and Business Sustainability**

*Jaspreet Sra, PhD candidate and Instructor, NRES and School of Business*

My research addresses the research gaps in the carbon-accounting related area from the business perspective. Environmental sustainability is key to business sustainability during climate change crises and global warming. Focusing on voluntary carbon reporting through the Carbon Disclosure Project (CDP) platform for environmental and business sustainability, I posit that voluntary environment-related disclosures are a prerequisite to understanding companies' actions towards ecological sustainability. I examined whether investors value the firm's environmental sustainability efforts, focusing on global 500 companies for the period 2010 - 2018. The proxies for ecological sustainability efforts include carbon emissions amounts, carbon intensity, and disclosure quality. This research is based on those global corporations that chose to disclose their carbon-related data to the CDP during the study period. The findings showed that voluntary disclosures contain market value relevance content. Using a more robust econometric approach (Difference GMM) and extended balance sheet model, this study found that the market values the companies' environmental sustainability efforts, increasing the firm's market value.

On positive notes, more than fifty percent of the corporations whom CDP approached for their environmental-related disclosures reported to the CDP, indicating that these firms are already in the war against climate change and working on business and environmental sustainability. Moreover, these efforts would pay them off more in a mandatory environmental-related disclosure regime. My work is voluntary carbon disclosures based. However, as part of the company's annual reports, mandatory environmental-related disclosures can be more informative for potential investors and other stakeholders.

### **Reflections on The Trump Revolution Through the Lens of 19th Century French Politics: Karl Marx and Maurice Joly as Historical**

*Dr. Douglas Jarvis, Assistant Professor, Political Science/History*

A constant historical theme of the Trump Presidency, beginning with his election campaign, was a heightened level of emotional zealotry and revolutionary rhetoric throughout the American ideological spectrum. Both the Tea Party Movement and Occupy Movement played major roles in creating the cultural norms for this new turn in American politics. American civic culture has had to grapple with a new revolutionary and reactionary dichotomy to how politics is perceived, which is like 19th century France with the rise of Napoleon III. Figures of mid-19th century European political theory that were critically engaged with Napoleon III's regime, that being Karl Marx and Maurice Joly, articulate and describe the similar political forces and tactics at play in the ever-antagonistic perception of America's right/left ideological camps towards each other. Marx described how Napoleon III represented the first political leader in modern history to articulate reactionary calls for national tradition and interest in explicitly revolutionary despotic terms, which was driven at its core by class-based divisions in a changing French nation. Maurice Joly, in his analysis of Napoleon III, pinpointed the integral role that rhetoric surrounding "conspiracies" are in accumulating power in a mass society defined by heightened class divisions and proliferating communication technologies. Both Marx and Joly, in their analysis of mid-19th century French politics, primordially express the thematic structure for America's recent turn in political culture and rhetoric following the rise of Trump, regardless of ideological perspective.

### **Revitalization in Resource Communities: A way of Encouraging Tourism in British Columbia**

*Cyan LeMool, BA student, Geography/History*

This presentation will examine the historical cultural revitalization of communities within the interior of British Columbia, specifically exploring Kimberly, Nelson, Revelstoke and Rossland. I will demonstrate what revitalization projects meant for these communities that were otherwise struggling and how this worked to boost the tourism industry and the local economy. With the help of a geographical lens I will analyze how the revitalization projects in these communities were similar yet different in their motivations, methods and practices. Overall, this paper will examine how revitalization projects were used in order to boost the tourism industry in places where the local economy was declining.

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**10:30am–10:45am Break**

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**10:45am–12:00pm**

## **Poster Presentations**

**In-person: Conference Centre 6-205 \*Masks must be worn as per PHO and UNBC policy**

**Online: <https://unbc.zoom.us/j/68071205566?pwd=Z3ZRb3hVNEhqYytPeUltRUZFZWUUT09>**

**Passcode: 996239**

### **Natural Product Discovery of Piperazic Acid Containing Peptides**

*Lya Campos Rivera, BSc Honours student, Chemistry*

This research is on the production of new natural products to discover piperazic acid (Piz) containing nonribosomal peptides (NRP). Incarnatapeptin A (1) and B (2), and dentigerumycin F (3) and G (4) are Piz-containing NRP produced by the Streptomyces Incarnatus NRRL 8089 bacterium and discovered utilizing a genome mining/nitrogen-NMR approach. 3 and 4 are easily produced linear Piz containing compounds by the bacterium and are congeners of 1 and 2 which are produced in minor amounts by the bacterium. Like dentigerumycin F and G, incarnatapeptin A is a linear NRP; these linear peptides do not display bioactivities in tested assays. Incarnatapeptin B, the cyclic congener of 1, displays a rare specific activity against an androgen-dependent prostate cancer cell line. Due to the genome mined discovery, it is known that the same gene cluster producing 1 and 2 and the divergent 3 and 4 is predicted to produce additional Piz-containing NRPs. Despite this bioinformatic knowledge, no evidence of the cyclic congener of 3 and 4 (of interest due to potential bioactivity) or other predicted natural products were found in the initial bacterial cultures used to isolate 1-4. This research constitutes on comparing different precursor fed extracts of the bacteria to determine if the production of more members of these families can be elicited from *S. incarnatus* NRRL 8089. Isolation and structure elucidation of unknown Piz-containing NRPs will be conducted. Additionally, the semi-synthesis of the bioinformatically predicted cyclic congener of isolated 3 and 4 will allow bioactivity comparisons and structure-activity relationship studies.

### **Isolation and Protein Characterization of Oligodendrocyte Derived Small Extracellular Vesicles**

*Connor Johnson, MSc student, MCPM*

Oligodendrocytes are a type of glial cell responsible for myelinating neuronal axons within the central nervous system. Glial cells also provide trophic support to neurons. Extracellular vesicles are believed to be a key biomolecule produced by oligodendrocytes involved in mediating trophic support of the axons they encase; however, their characterization is currently lacking. Here, oligodendrocyte derived extracellular vesicles were isolated from the CG4 cell line across each differentiation stage: progenitor (day 0), early differentiation (day 2), mid differentiation (day 4), and late differentiation (day 6). Assessment of cell lysates for the myelin protein 2',3'-Cyclic-nucleotide 3'-phosphodiesterase (CNP) revealed up-regulation of expression at day 6 confirming cells are differentiating. Isolated extracellular vesicles were assessed by Western blot for commonly used markers: CD9, CD44, CD63, CD81, and TSG101. Differential expression was observed across each differentiation stage for each respective marker with extracellular vesicles isolated from progenitor oligodendrocytes yielded the highest expression. Probing cell lysates revealed a similar trend in expression with the exception of CD9 which

had the highest observed signal in late differentiated oligodendrocytes. CD81 expression in cell lysates was inconclusive. This study suggests that different populations of extracellular vesicles are released during oligodendrocyte differentiation and provides the framework for more comprehensive analyses.

### **Effects of Glyphosate on Melatonin level in Strawberries under three different Environmental conditions**

*Hariharan Sendamangalam Varudaraju, MSc student, Natural Resources and Environmental Studies*

Effects of Glyphosate on Melatonin level in Strawberries under three different Environmental conditions  
Abstract (maximum 250 words): Glyphosate is a systemic, broad-spectrum herbicide used all over the world and especially in Canadian silviculture. The sprayed herbicide not only affects the targeted plant but also reaches the non-target plants mainly due to spray drift, temperature, wind direction, and rainfall. The sublethal concentration doesn't kill the plants however, it leads to malformation of plant parts. Plants produce hormones to combat stress conditions and melatonin is one of the stress response molecules which increase in their concentration whenever the plants are exposed to heat, cold, metal, and chemical stresses. Although melatonin increases during stress conditions application of glyphosate pose a major threat for melatonin production as the application of glyphosate disrupts the production of 5-enol-pyruvyl-shikimate-3-phosphate synthase (EPSPS), which catalyzes the sixth step in the shikimic acid pathway. By blocking the enzyme, glyphosate prevents the biosynthesis of aromatic amino acids that include phenylalanine, tyrosine, and tryptophan, produced through the shikimate pathway.

Tyrosine and Tryptophan act as the major precursors of melatonin. To study the effect of how glyphosate affects melatonin production in various temperatures and light periods, strawberry plants were exposed to three different environmental conditions in the growth chamber.

### **Community Level Wildfire Adaptation in British Columbia**

*James Whitehead, MSc student, Natural Resources and Environmental Studies – Geography*

Climate change is driving rapid changes in social-ecological systems. Rising temperatures have resulted in prolonged drought periods and significantly longer wildfire seasons. In western Canada, British Columbia (B.C.) has experienced three record-breaking fire seasons in the last five years. As wildfires have become more prolific, so has their impact on ecosystems and human communities. Rural and remote communities, including First Nations, are especially at risk due to their location in wildfire prone areas, remoteness, and limited access and escape routes.

Efforts are being made to mitigate wildfire risks at both the community and regional levels. These efforts commonly include government sponsored timber harvesting, brushing, and removing deadfall in and around communities. Most of this work is driven by wildfire research that focuses on the biophysical characteristics of the system such as fuel density, with less attention given to the social components. Humans are often considered to be passive victims of wildfires, when in fact, humans are active players in mitigating risk and adapting to changing conditions.

This research seeks to understand the ways in which a rural community located in northern B.C. is vulnerable to wildfire hazard and to identify opportunities to reduce risk. This will involve working with people in a particular community to document how they are exposed and sensitive to wildfire hazard, and the conditions that influence their ability to manage risk. The expected findings are intended to

contribute to the development of wildfire adaptation planning that better reflects the knowledge, priorities, and values of local communities.

### **Local Government Matters**

*Jason Morris, Senior Instructor, Political Science*

Each year, the students of Political Science 320 Canadian Politics and Policy, learn research methods and research ethics, and then design and implement a research project in the community. This year marks the tenth annual undertaking of this project. The research is a public opinion survey. For 2022, with it being a local government election year, students are looking at issues related to the City of Prince George. They are working with the Prince George Chamber of Commerce as a partner. Their research is expected to inform the development of a chamber position paper for the annual general meeting of all provincial chambers of commerce, anticipated to be held in Prince George this June. The poster for Research Days will set out how this research is being conducted. This will include what it means to acquire and then assess new knowledge, the value of community engagement, and the importance of ethics in all stages of doing research.

### **The Tahtsa Ranges Atmospheric Rivers Experiment**

*Kelly Hurley, Research Technician, Environmental Science*

Throughout November 2021, many British Columbians became familiar with the term “Atmospheric River” (AR) as a succession of intense AR storms hit southwestern parts of the province, resulting in intense flooding and landslides, devastating human and livestock casualties, and British Columbia’s (BC) costliest natural disaster to date. Despite their potential adverse effects, AR storms are a natural, seasonal phenomenon that can also help replenish critical water resources. To understand the multifaceted effects AR storms have on the Upper Nechako Watershed (UNW), a dam-controlled watershed that supplies the 1000 megawatt Kemano Powerhouse as well as critical fish habitat, we conducted the Tahtsa Ranges Atmospheric Rivers Experiment (TRARE). Over 28 state-of-the-art instruments and sensors were deployed at 15 field sites along longitudinal and elevation gradients in the UNW. Our team was made up of nine members of UNBC’s Northern Hydrometeorological Group (NHG), two from l’Université du Québec à Montréal (UQAM), and Cheslatta Carrier Nation (CCN) citizen scientists. Together, our team measured the climatic variables of five AR storms and the characteristics of their hydrometeors over 59 days between September – November 2021. As a result, participants were trained in remote fieldwork and the deployment and maintenance of state-of-the-art meteorological and hydrological equipment. TRARE expanded the availability of in-situ hydrometeorological data in a sparsely-monitored (but hydrologically significant) area. The 75 gigabytes of data collected will provide critical data for graduate students and post-doctoral fellows to characterize AR storms and understand their impacts on the hydrology of the UNW.

### **Synthetic Biology Approach to Produce Small Molecule Natural Products**

*Komal Naeem, MSc student, Chemistry and Biochemistry*

Natural products (NPs) are indispensable to current medication, with 73% of anti-toxins, 49% of anticancer molecules, and 32% of all new medications endorsed by the U.S. Food and Drug

Administration during 1980 and 2012 being natural products or derivatives thereof. Mushrooms are prolific biosynthetic manufacturers of pharmaceutically significant natural products. Latest developments in genome sequencing evidenced the existence of almost 5 million mushroom species on Earth, with each species translating to almost 80 natural product biosynthetic pathways. Nevertheless, notwithstanding the expanded simplicity of DNA sequencing, fungal growth under lab conditions continues to be a bottleneck. The expression of most of the natural product biosynthetic gene clusters (npBGCs) present in the genome can remain silent even within cultured species. The characterization and expression of npBGCs therefore offer a great opportunity to discover novel natural products mainly from the basidiomycetes that have not been explored much for npBGCs. To this end, Dr. Lee's lab at UNBC has recently isolated bioactive triterpenes (echinodol and echinodone) and a small polyketide molecule (bis(2,4-dihydroxy-6-methylphenyl) methane) from *E. tinctorium*. Considering the need for further investigation of underlying biosynthetic pathways involved in the synthesis of above-mentioned small molecules, this study is designed for: (i) Bioinformatic analysis of *E. tinctorium* genome retrieved from 1000 fungal genome project to identify the npBGCs for echinodol, echinodone and bis(2,4-dihydroxy-6-methylphenyl) methane, (ii) Cloning and heterologous expression of npBGCs in suitable host, and (iii) Isolation, purification and structural elucidation of the active molecules by using silica gel column chromatography, HPLC, LC-MS, FTIR and NMR.

### **Asexual Patients Generating Recommendations for Future Healthcare Research**

*Lindsay Carpenter, BHSc Honours student, Biomedical Studies*

A healthy, stable absence of sexual attraction is the norm for people who identify as asexual. When asexual people seek healthcare, they often encounter practitioners who disbelieve their identity or construe it as a disorder, leading to decreased quality of care. A literature review was conducted to identify recommendations for future research and practice. Preliminary inductive thematic analysis of 77 verbatim recommendations yielded four themes: (1) Being Asexual Can Threaten Health Before and During Care, (2) Practitioners Must Unlearn and Relearn, (3) Characterizing Asexuality Through Research to Improve Care, and (4) Delivering Best Possible Care. Collectively, the themes told a story of research and education coming together to create knowledgeable practitioners who can improve asexual health disparities through identity-affirming care. However, the majority of the recommendations analyzed were derived from researchers, rather than asexual patients themselves. To address this gap, a sample of asexual patients will be recruited from the Asexuality Visibility and Education Network (AVEN) and interviewed about their healthcare experiences. The themes previously derived will be used as a deductive framework so that researcher and patient priorities can be compared. This study aims to direct future asexual healthcare research towards topics that patients consider most important.

### **Identifying Differences in Myelin Protein Content During Aging using Subcellular Fractionation and Western Blotting**

*Shaheer Lakhani, BSc student, Biochemistry and Molecular Biology*

Myelin is a lipid-rich membrane that comprises the myelin sheaths of the nervous system, which are critical for transmission of brain signals and protection of neurons. The loss of myelin can lead to a slowing or stopping of nerve impulses, commonly seen in demyelinating disorders such as multiple sclerosis (MS). This study aims to identify differences in myelin protein content in control and transgenic

mice during aging, by first optimizing isolation and downstream analysis techniques. Myelin proteins from mice will be analyzed by Western Blot (WB) consisting of four groups: young wildtype, old wildtype, young Sirt2 and old Sirt2 mice. Targets in this study include Sirtuin-2, CNPase, MBP, PLP, and MOG, proteins commonly found in myelin. Isolation of myelin membrane fragments was accomplished using subcellular fractionation of wildtype and transgenic mice brain tissue, where discontinuous sucrose gradients were utilized to separate compact and non-compact myelin based on density. A modified protein quantification assay has been developed, and the WB procedure has been optimized for analysis of myelin proteins in mouse brain tissue. Identification of myelin proteins that differ across age groups, notably with the loss of Sirtuin-2, allows for further research which can lead towards an understanding of the molecular mechanisms that regulate myelination. This study has the potential to lay the foundation for a better understanding of demyelinating diseases such as MS.

### **Trainee reflective practice – strengthening capacity of a new cadre of researchers, practitioners, and community members**

*Makayla Skrlac, Research Associate, LEAPH Lab*

*Katya Korol-O'Dwyer, Research Assistant, ECHO Network*

To initiate a multi-part, asynchronous reflection activity for ECHO Network Trainees, with the intent of sharing and reflecting on trainee experiences, perspectives, and insights, as a capacity-strengthening process for ‘intersectoral prevention research’. A three-part approach was taken: Part 1 – Collective development of Trainee team pursuit informed by co-construction and iterative processes (Magis et al., 2020; Foudriat, 2016; Foudriat, 2014); Part 2 – An asynchronous reflection activity, using Survey Monkey, prompted Trainees to reflect on their engagements within the Network; and, Part 3 – Thematic analysis of qualitative data to identify key insights on trainee capacity-strengthening.

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**12:00pm–1:30pm**

### **Global Friday Speakers Series — Feminist Politics in the Neoliberal Academy: Subversion and Structural Change through Dissident Friendships**

*Dr. Ethel Tungohan, Canada Research Chair in Canadian Migration Policy, Impacts and Activism, Department of Politics, York University*

Co-hosted by Inspiring Women Among Us and the Office of Research and Innovation for International Women’s Day

**Zoom link:**

<https://unbc.zoom.us/j/63735901167?pwd=dUNRcC9ibm9pd0lrYlIWbDEyM2FJZz09>

**Webinar ID: 637 3590 1167**

**Passcode: 251714**

That the academy is not a meritocracy is a reality that women, BIPOC students, staff, and professors, and other members of equity-deserving groups have known for a long time. From facing double standards that put heightened expectations on members of underrepresented communities to salary discrepancies to everyday forms of microaggression that signal that one does not belong; the academy is a fraught space. In this presentation, I will discuss the generative possibilities of structural transformation in the academy through the formation of affective networks and through the

establishment of dissident friendships. These friendships, in fact, form a crucial part of feminist politics. To show the cathartic effects of dissident friendships, I discuss why and how I started my podcast, "Academic Aunties," which has, since its inception in March 2021, been downloaded 13,000 times globally, with each episode getting between 500 to 1000+ unique listeners. Through references to the lessons imparted by academic 'aunties' who've appeared on the podcast, I address why our goal to transform the academy should not only centre liberal modes of inclusion and why our goal should always be not to accept what is, but to think of what could be.

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**1:30pm–3:30pm**

**Three Minute Thesis (3MT®) Competition**

**Zoom link:**

<https://unbc.zoom.us/j/65667492393?pwd=RHZUZU1qMIN6V0t4TIR1MzFoYjJsUT09>

**Passcode: 839947**

Join us for this exciting graduate student research communication competition, which challenges students to present a compelling oration on their thesis topic and its significance in just three minutes!

Host: *Dr. Jonathan Alschech, Assistant Professor, School of Social Work*

Judges:

*Dr. Art Fredeen, Professor, Ecosystem Science and Management*

*Bonnie Fuller, Instructor, Education*

*Dr. Fiona MacDonald, Assistant Professor, Political Science*

*Dr. Heather Smith, Professor, Global and International Studies*

*Lydia Troc, Manager of Health & Safety*

Competitors:

*Sanaz Sediqi, PhD student, School of Engineering*

Presentation Title: Local scour around bridge abutment with vegetated bed under ice-covered flow condition

*Maryam Ghaffarzadeh, PhD student, Health Sciences*

Presentation Title: The role of introns in *Cyanidioschyzon merolae*

*Oghenerukevwe Onororemu, MSc student, Nursing*

Presentation Title: The value of pediatric practicum in undergraduate nursing

*Aven Knutson, MA student, NRES*

Presentation Title: Procedural justice and self-determination in a Yukon climate planning partnership

*Cheri Brown, MA student, First Nations Studies*

Presentation Title: Indigenous Post-Secondary Student Lived Experience: Stories of Resistance and Alignment with Identity and Culture

*Fatemeh Nouroozi, PhD student, NRES*

Presentation Title: Designing of novel solid adsorptive medias for Removal of Heavy metals from water

*Fatemeh Mohammadnejad, MSc student, Health Sciences*

Presentation Title: Registered nurses' perspectives towards use of technology on nursing workload in rural and nursing communities

*Guowei Li, PhD student, Science and Engineering*

Presentation Title: Local Scour around Fully Submerged Spur Dikes under Ice-covered Conditions

*Hariharan Sendamangalam Varudaraju, MSc student, NRES*

Presentation Title: Effects of Glyphosate on Melatonin content in Strawberries at three different Environmental conditions

*Hossein Zeinalzadeh, MSc student, NRES*

Presentation Title: Design of Metal Organic Framework composite for CO<sub>2</sub> Capture Application

*Mya Schowenborg, MSc student, NRES*

Presentation Title: A Workplace Crisis

*Olusola Adeyinka, MBA student, School of Business*

Presentation Title: Effects of Micromanagement on Employees

*Rahim Jafari, PhD student, NRES*

Presentation Title: Reduction of Local Scour at Bridge Abutment by Application of Spur Dike

*Rulan Xiao, MSc student, NRES-Geography*

Presentation Title: How dry is our forest

*Samira Mohammadyzadeh, PhD student, NRES*

Presentation Title: Dynamic Properties of Tall Timber Buildings

*Stephanie Chan, MSc student, NRES*

Presentation Title: Arctic Marine Ecosystems

*Tavia McKinnon, MSW student, School of Social Work*

Presentation Title: Youth Relationships with Land and Place in the Nechako Watershed

*Zhaleh Nazarpour Boroujeni, MSc student, Business Administration*

Presentation Title: Developing the Guidelines for the Digital Transformation Process based on the Actor Modeling Framework

*Katherine Timms, MSc student, Interdisciplinary Studies*

Presentation Title: Molecular characterization of early adipose tissue fibrosis in the development of diet-induced obesity in mice

## **Research Week Closing Remarks**

*Dr. Kathy Lewis, Acting Vice President Research*

## **Lheidli T'enneh Closing Prayer**

*Elder Edie Frederick*

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**3:30pm–4:30pm**

**NRESi Colloquium — Natural Product Discovery - Accessing Chemical Diversity**

*Presenter: Dr. Kalindi Morgan*

**In-person: Room 7-212 \*Masks must be worn as per PHO and UNBC policy**

**Online: <https://www2.unbc.ca/nres-institute/colloquium-webcasts>**

Natural product discovery gives us access to organic molecules of medical and agrochemical use from organisms such as bacteria, fungi and plants. Innovative methods to discover novel bacterial natural products can reveal previously overlooked chemical diversity. One such method is genome mining, where sequenced bacterial genomes are assessed for the presence of biosynthetic gene clusters.

Following genome mining, organic molecules can be accessed by growing the bacteria in order to isolate and complete the structure elucidation of novel natural products. There is particular interest in piperazic acid(Piz)-containing natural products as they are often associated with biological activity and structural novelty. Four Piz-containing natural products were isolated from *Streptomyces* *incarnatus* NRRL 8089 in very minor quantities utilizing a novel  $^{15}\text{N}$  NMR-genome mining hybrid approach. Despite the isolation of these diverse compounds predicted to arise from the same gene cluster, analysis predicts the presence of additional natural products. Current efforts are exploring methods to elicit the expression of further organic compounds from *S. incarnatus* NRRL 8089, along with semi-synthetic avenues of producing the bioinformatically predicted molecules.