BYRNE SEMINARS SPRING 2021
WHAT ARE BYRNE SEMINARS?
Byrne Seminars are small, one-credit courses, limited to 20 students. Offered through the Office of Undergraduate Education, these classes are taught by our world-renowned faculty who come from departments and professional schools across the university. Each unique seminar offers you the chance to experience the excitement of original research, as faculty members share their curiosity, their intellectual passion, and their new ideas and fields of knowledge. During remote instruction, you may meet nationally renowned authors, chefs, political leaders, or scientists as invited guests. Seminars typically meet for 10 weeks, starting in the first week of each semester. Seminars are graded Pass/No Credit, and have no formal exams. You may register for a one-credit seminar in addition to the 12-15 credit standard course-load. These seminars are meant to enhance your learning and not compete with your other courses.

HOW DO I SIGN UP?
You can register for a Byrne Seminar through WebReg starting in December. This catalog also includes section numbers for each spring seminar below the course description. You may find the Online Schedule of Classes useful in determining which courses are open and will best fit into your schedule. Enter subject code "090" and course number "101" to get a list of Byrne Seminars for the semester, including up-to-date information about time and location.

HAVE QUESTIONS?
Email: byrneseminars@rutgers.edu / Call 848.932.6971
Or visit our website: BYRNE.RUTGERS.EDU

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FROM THE FACULTY DIRECTOR

Welcome to Rutgers! I am very glad you are here. As you start your first year at Rutgers, I am about to start my forty-seventh year here. I often wish that there were Byrne Seminars back when I was a freshman in 1973, it is such a good experience. The faculty who teach in this great program are some of the top professors at Rutgers, individuals who are recognized in their discipline for their innovation, leadership, and scholarship.

I have been teaching in the Byrne Seminar Program since the program started and I am honored to be the Faculty Director for the Byrne Program. I feel fortunate to have this responsibility, and I welcome and encourage you to take advantage of this amazing opportunity.

The Byrne Seminars offers a wide array of titles and subjects, the classes give you a chance to discover new things and have fun. I urge you to consider taking one of these courses. Push your boundaries a little and take a class that is outside of your intended major or current interests. You may be surprised, this topic may become a new area of interest to you. With over fifty seminars, there are plenty of choices.

If you are on the fence about taking a Byrne Seminar, my advice is “jump off the fence” find one you like, and join the thousands of students who have participated and benefited from this fantastic first-year experience at Rutgers.

I wish you all good things for your first year at Rutgers.

Be safe, stay healthy and have fun,

Mark Gregory Robson, PhD MPH DrPH
Rutgers Board of Governors Distinguished Service Professor
Professor of Plant Biology
Faculty Director of the Byrne Seminar Program
The Innovation, Design, and Entrepreneurship Academy (i.d.e.a.) integrates design and entrepreneurial thinking into the Rutgers student experience. i.d.e.a. empowers students to explore what issues they care about most and what problems they are most driven to solve. In partnership with i.d.e.a., the Byrne First-Year Seminars program is pleased to offer seminars designed to expose students to how Rutgers faculty researchers and industry experts are addressing some of society’s most complex challenges. Each seminar will engage with a renowned research center or institute where faculty across disciplines are working to push the boundaries of knowledge on a wide range of topics including food and healthcare innovation, future cities, social justice, and climate change.

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COVID-19 and the Women’s Global Health Crisis

Rebecca Mark (Institute For Women’s Leadership)

Covid-19 has amplified what many public health professionals have known for years: women throughout the world are suffering from tremendous health disparities. Unequal power relations, poverty, violence, and decreased access to education disproportionately affect women and girls, creating barriers to attaining the best possible level of health. Without access to quality healthcare, plagued with generational diseases brought on by systemic racism and violence against women, women are facing an international health crisis. At the same time, women are not only caring for the health of children and the elderly in their own homes, they are disproportionately in low-paying caretaker roles in hospitals, nursing homes, and schools. The Institute for Women’s Leadership’s Gloria Steinem Chair, Naomi Klein, states clearly that “Care Work is Climate Work” making the connection between the health of women and the health of the planet. In this seminar you will be able to learn from the HIU Consortium director and professors at the Center for Women in Global Leadership, SoWomen, the Center for Violence against Women and Children, the Center for Women and Work, and the Institute for Research on Women concerning the challenges to women’s health. We will invite Institute for Women’s Leadership Scholars Certificate Program students to present their Social Action Projects on Women’s Global Health. We will invite doctors, mental health practitioners, nurses, and women leaders on the front line of the COVID pandemic, to talk to our class about how to create greater equity in women’s health for all women and for BIPOC (black, indigenous, people of color) women in particular here and around the world.

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Climate Change, Inequality, and Social Justice

Marjorie Kaplan (Rutgers Climate Institute) Anthony Broccoli (Rutgers Climate Institute) Robin Leichenko (Rutgers Climate Institute)

Climate change is an environmental, equity, and social justice issue. The physical processes that result in rising temperatures, changes in precipitation, and rising sea levels have uneven spatial outcomes, while the intersection of climate extremes and population inequities are interdependent and dependent on a healthy environment and a healthy planet. In this course, together we will trace the path food takes from its source to our plates and stomachs, stopping along the way to consider both practical and existential factors that influence what we eat, including sustainability, environmental health, economics, ethics, food science, culinary science, and nutrition. We will also explore the role of research and innovation in advancing the One Nutrition approach to feeding the planet. This course is sponsored by the One Nutrition Program and the Center for Agricultural Food Ecosystems, New Jersey Institute for Food, Nutrition & Health, and the Program in Agriculture and Food Systems, School of Environmental and Biological Sciences.

01:090:101 section 11

Feeding the Planet: Why We Need a One Nutrition Approach to Food Sustainability

Joshua Miller (New Jersey Institute for Food, Nutrition, and Health; Center for Agricultural Food Ecosystems) Xenia Morin (New Jersey Institute for Food, Nutrition, and Health; Center for Agricultural Food Ecosystems) James Simons (New Jersey Institute for Food, Nutrition, and Health; Center for Agricultural Food Ecosystems)

All that most people want is appetizing food to eat that is convenient, affordable, and safe. But, where does our food come from, and what are the consequences of our food choices and preferences, not only for our own health, but also the health of the planet? Join us on an exploration of a new concept called “One Nutrition”, developed here at Rutgers. One Nutrition is based on the recognition that food and nutrition is not only essential to human and animal health, but that human and animal nutrition are interdependent and dependent on a healthy environment and a healthy planet. In this course, together we will trace the path food takes from its sources to our plates and stomachs, stopping along the way to consider both practical and existential factors that influence what we eat, including sustainability, environmental health, economics, ethics, food science, culinary science, and nutrition. We will also explore the role of research and innovation in advancing the One Nutrition approach to feeding the planet. This course is sponsored by the One Nutrition Program and the Center for Agricultural Food Ecosystems, New Jersey Institute for Food, Nutrition & Health, and the Program in Agriculture and Food Systems, School of Environmental and Biological Sciences.

01:090:101 section 12

Future Internet and Smart Cities

Yingying Chen, Rich Howard, Rich Martin, Jorge Ortiz, Dipankar Raychaudhuri, Ivan Seskar, and Predrag Spasojevic (Rutgers WNLAB)

As urban populations increase, solutions to challenges in mobility, infrastructure, and housing are of utmost importance to society. Disruptive technologies have the potential to transform the way cities currently operate and the way that we communicate. Smart cities and smart homes are making our world more intelligent and more responsive as billions of physical devices around the world are now connected to the Internet. This seminar is designed to provide students with an introduction to the most cutting edge questions and topics related to the development of smart cities, the future internet and the Internet of Things (IoT). We will invite faculty and industry partners from WNLAB at Rutgers University to give lectures on cutting-edge topics and trends, including, but not limited to future Internet, 5G networks, smart cities/homes, mobile computing, Internet of Things (IoT), connected vehicles and E-health. Furthermore, the development of the Internet and mobile computing has opened up unprecedented possibilities in E-health and smart healthcare. In this course, students will learn how researchers and engineers leverage state-of-the-art technologies, such as artificial intelligence, big data, cloud computing, and data mining, to fuse the healthcare information of patients and provide insights into early disease diagnosis, telemedicine, and telemedicine.

01:090:101 section 43

Road to COVID-19 Vaccination: Exploration of Innovation, Design Thinking, and Healthcare

Hajar Shirley (Rutgers Global Health Institute) Shawna Hudson (Rutgers Global Health Institute) Nancy Pontes (Rutgers Global Health Institute) Predrag Spasojevic (Rutgers WNLAB)

2020 is an unprecedented year. As the world unites to respond to COVID-19, this seminar will expose students to research and innovation occurring right in New Brunswick. NJ. In partnership with the Rutgers health institutes and a broadly-based global healthcare company in New Brunswick, students will engage with researchers and leaders on understanding the road to a COVID-19 vaccination. The seminar will start with an engaging talk with health community leaders in New Brunswick. Students will then engage in talks to learn the basics of vaccinations, testing innovation led by Rutgers, and addressing health disparities exacerbated by COVID-19. We will then connect with leaders across the healthcare industry focused on providing 500 Million doses by 2021 while assessing the needs of New Brunswick. Students will engage with healthcare innovation thought leaders to understand how different functions ranging from Research & Development to Supply Chain are contributing to the global vaccination goal. This seminar provides an opportunity for students to embark on a journey alongside Rutgers health researchers, healthcare industry leaders, and New Brunswick community health leaders while learning innovation skills, design thinking, and entrepreneurial approaches to solving real-world healthcare challenges. Students will get real, hands-on experience and will have an opportunity to unpack issues that will help New Brunswick communities improve their health—potentially leading to a competitive paid internship experience in New Brunswick during Summer 2021.

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How to Learn a Chinese Dialect

Richard V. Simmons (Asian Languages and Cultures)

Learn Cantonese, Taiwanese, Shanghainese, and maybe even others! This seminar will introduce the fundamentals of a single Chinese dialect over the 10-week course. The specific language we will study will be chosen by a poll of the registered students before the class starts. By the end of the course students will be able to carry out simple basic conversational tasks in the language, write the dialect in Romanization, and be equipped with the skills to continue to learn the dialect on their own. Successful completion of the course requires regular attendance and participation, as well as composing and presenting a short conversational skit at the end of the course. This course has no prerequisites. Knowledge of Standard Chinese (aka Mandarin) is not required. Native and heritage speakers of Chinese dialects are welcome to take the course and to serve as linguistic informants or tutors.

01:090:101 section 50

The Ludovisi Collection of Art in Rome: A 400th Anniversary Seminar

T. Corey Brennan (Classics)

The year 2021 marks the 400th anniversary of the formation of the Villa Ludovisi, a sprawling art-filled garden property in north-central Rome, largely but not completely dismantled in 1885. To tell its story at this significant juncture, this seminar draws on a deep reservoir of Rutgers-funded research on this cultural landmark, and offers students hands-on work with recently recovered and comprehensively digitized documentary sources and historical images, including the results of a new (2019) photographic campaign of Ludovisi-commissioned frescoes. The seminar also adds to the analytic mix an entirely fresh and invaluable perspective—the family’s unusually rich and well-informed oral history, captured by Rutgers student filmmakers over the course of two recent summers. Students will research the story of the improbably large urban green space that in 1621 the brash and enterprising Cardinal Ludovico Ludovisi created to make his home, and document how his Villa Ludovisi and the vast art collection he formed for it (in just 18 months) won the open-paced admiration of a long list of noted visitors in the centuries to follow. Amazingly, the Cardinal’s secondary palace and its immediate property remain wholly intact as a private residence, handed down in unbroken succession to the heads of the Ludovisi (later Boncompagni Ludovisi) family right to the present day. As a capstone to the seminar, Byrne students are assigned an unpublished object, image or archival document relating to the Villa Ludovisi, and present a short in-class report on the findings of their guided research.

01:090:101 section 44

Yoga: Finding Calm in Chaos

John Evans (Dance)

This seminar will help you bous in finding calm in your life while joining the ranks of busy college students. Through the study and practice of yoga, we will explore how to build a stronger mind-body connection. This course will assist you in learning how the practice of yoga can support a happy and healthy life. Through centering and breathing techniques, strengthening and stretching yoga postures, and simple meditations, students will begin to gain a better sense of well-being. We will investigate mindfulness trainings and yoga sequences throughout the ten-week seminar.

01:090:101 section 34
Dystopian Fiction, Carceral Regimes, and State-Corporate Crime: Innovative Approaches to Critical Criminology

Kenneth Leon (Latino & Caribbean Studies; Criminal Justice)

At a time when fundamental questions about democracy, citizenship, representation, and justice are being raised, the direct connections between criminal justice reforms and democratic systems are rarely emphasized. Empirical evidence continues to highlight the glaring contradiction of a country that projects a message of freedom and democracy while simultaneously being home to the most expansive system of incarceration and punitive control ever known to modern history. Through the use of substantive lectures, guest speakers, multimedia presentations, and site visits, students who successfully complete this Byrne Seminar will be able to: 1. Understand the ways in which systems of state governance, commercial enterprises, and non-profit organizations are built around and upon the project of mass imprisonment; 2. Analyze the relationship between Western legal and political theory and the systematic exclusion and under-representation of various groups in U.S. history; 3. Historically situate the concept of citizenship in U.S. policy and practice; 4. Understand how criminal law and the institutions of criminal justice have and continue to be leveraged to advance instrumental political ends; 5. Successfully engage in civil debate concerning the avenues for advancing an emancipatory, inclusive society; 6. Reflect on the role of the college student experience and institutions of higher education in addressing fundamental questions of law, order, governance, and power.

01:090:101 section 18

Fundraising Principles: Raising Money for Good Causes

Richard L. Edwards (Chancellor Emeritus and University Professor)

How do nonprofit organizations raise money? In this seminar, you will gain knowledge and skills to help lead student-sponsored fundraising events on campus, in your community, and beyond. Building on fundraising experiences you may have already had in community, school or faith-based organizations, this seminar will introduce you to the basics of fundraising theory and practice, including special-event planning, individual solicitations, and telethons. Participants will benefit from Rutgers fundraising experts and guest speakers. The seminar includes discussions, role-playing, and presentations, and the class will review fundraising events that have been successfully implemented by local nonprofit and public charity organizations.

01:090:101 section 07
Only in New Jersey! New Jersey’s History in Newspapers
Caryn Radick (Rutgers Libraries)

Politics, Wars. Crimes. Scandals. Shark Attacks. Celebrations. New Jersey had it all. Before the advent of radio, television, and the Internet, newspapers were vital for the sharing and dissemination of information. New Jersey had hundreds of local newspapers, each providing a unique snapshot of a community. These resources are still widely used by historians and genealogists and provide important insight into the daily life of another time. In 2016, New Jersey joined the National Endowment for the Humanities’ National Digital Newspaper Program, an effort to digitize historical New Jersey newspapers from microfilm. These newspapers are now available online at the Library of Congress’s Chronicling America website (https://chroniclingamerica.loc.gov/) and more are being added. This seminar will look at the history of New Jersey newspapers and efforts of the newspaper project and consider how New Jersey newspapers shared news with their communities in the mid-to-late 19th and early 20th centuries, including news stories, society news, advertisements, and illustrations and photographs. Each student will learn about how life in New Jersey unfolded in its newspaper and will compare how stories were told and shared then and now.

Social Engagement in XR (Extended Reality)
Richard Anderson (Division of Continuing Studies)
Daniel Swern (School of Communication and Information)

Cities face challenges when it comes to messaging about available social services, historical curiosities, and creative culture. Community access isn’t necessarily limited by financial or bureaucratic barriers, but through wayfinding and navigation due to poor signage or a dearth of public information. Through web-based tools in XR (extended reality, inclusive of augmented and virtual reality), our smartphones can give us the ability to immediately reveal resources hidden in plain sight as well as provide on-the-fly context and insight for both our built and natural environments. XR integrates real world experience with virtual world access. When produced as a robust community-based ecosystem, XR adds another layer of texture to the places where we live and work, and fundamentally changes the way we think about a traditional neighborhood. By using the mobile camera to frame and interact with the world, we’re helping people frame and interpret what they are seeing. Through the use of game mechanics and incentives, we’re enhancing and encouraging exploration and fighting isolation between individuals. Students will learn augmented reality 3D-modeling and game development in Unity (ubiquitous developer software) and meet with New Brunswick community and nonprofit leaders to marry their applied technical and creative skills with real world service access needs. Deier Park on College Avenue Campus will serve as the real world workspace for XR development as it is public space right on campus that represents a convergence of unique creative, environmental, residential, transportation, and service access challenges and opportunities to be explored in the technology lab.

Social and Organizational Networks: Introduction to a Connected World
Katherine Ognyanova (School of Communication and Information) Sophia Fu (School of Communication and Information)

Interconnected social and natural systems are all around us. In our daily life, we participate in networks of friendship, social support, (mis)information sharing, and communication. In our work, we are part of organizational and industry networks. We are surrounded by technological, physical, and biological networks. Their structure and characteristics shape our lives in ways that we may not always anticipate. This seminar will examine the emergence of social and organizational networks, focusing on their role in our social life. We will discuss how those connections form and how they influence our behavior. Students will learn the basics of network theory and social network analysis. The course will explore the network mechanisms behind power, influence, and creativity in our social environment. The role of networks in information diffusion, knowledge transmission, as well as the spread of both viruses and viral messages will also be discussed. Students will learn how to calculate and interpret key graph metrics providing insight into the structure of networks. The course will also cover ways of identifying influential actors and communities, as well as recognizing structural opportunities and challenges. Students will learn to create and interpret network graphs and diagrams. Furthermore, through invited speakers from the industry working on social networks and social network analysis, students will be able to gain a deeper understanding of the role of social networks in professional development, public policy, and public health arenas.
Sound Mind, Sound Body: The Last 50 Years of Intercollegiate Athletics

Carl Kirschner (Spanish and Portuguese)

The world of intercollegiate athletics has changed dramatically from the days of regional competitions without media coverage to the present national stage with constant television and internet coverage. What are those principal changes? What role have universities played; has the National Collegiate Athletic Association (NCAA) played; has television played? In 2020, what challenges face college athletics? Is the current system sustainable? The seminar will review the history of intercollegiate athletics with special emphases on the effects of civil rights and title IX legislation, on the challenges resulting from the influx of TV money, and on the last ten years and on Rutgers in particular. There will be guests, including some of the more successful student athletes, current and past. Significant case studies involving other universities will be reviewed. In addition to the assigned readings, students will make presentations on topics related to the subject.

01:090:101 section 33

The Languages That Surround Us: Mapping the Linguistic Landscape of New Brunswick

Nicole Houser (Director, Rutgers English Language Institute)

Are you interested in learning more about the linguistic and cultural diversity of our community? Would you like to participate in a new research project that documents the rich linguistic diversity of Rutgers New Brunswick? In this course, you will conduct field work to collect and analyze various types of linguistic data (signs, advertisements, interviews with community members) to investigate all languages spoken in the New Brunswick community, present and past. Your findings will contribute to a large-scale research initiative on linguistic diversity at Rutgers, "The Linguistic Landscape Project.”

01:090:101 section 53

The Politics of Identity and the Common Good: To the Left, to the Right?

Jeffrey Longhofer (Social Work)

This Byrne seminar will focus on the politics of identity and different kinds of claims for social justice. Some, for example, argue for redistribution of resources and others for recognition of cultural difference. Many have argued that these kinds of claims lead to polarization (e.g., choosing between class politics and identity politics). The seminar will consider how the problem of “identity” emerges with modernity. We will explore the meanings of, and problems associated with personal and group identities. We will consider the ways that finding oneself in a universe of potential identities is simultaneously challenging and problematic. Finally, we will consider how a politics of identity competes with, supports, or undermines a politics of the common good.

01:090:101 section 29

The Undiscovered Paul Robeson

Edward Ramsamy (Chair, Africana Studies)

The life and legacy of the esteemed Rutgers alumnus Paul Robeson embodies the idea of “global citizenship.” A towering figure in the African-American struggle for human dignity and democratic rights, he connected this struggle with those of other peoples around the world who were also fighting for political rights, cultural recognition, and economic justice. Among many other social justice movements that he embraced, Paul Robeson pioneered the global solidarity movement against racial segregation and white supremacy in South Africa and supported and marched with various British union movements in the United Kingdom struggling for better working conditions. The seminar introduces students to the life and legacy of Paul Robeson, especially with respect to how he integrated “home” and “world” into his civil rights activism. The seminar has a fourfold focus: (1) to explore Paul Robeson’s formative years as a student at Rutgers and the challenges he faced as the only black student in his graduating class; (2) to examine some of his artistic achievements as an actor on the stage and screen, especially his role in promoting African-American folk songs on the concert stages of the world; (3) to study his efforts to connect anti-fascism, anti-imperialism and anti-imperialism together; and (4) to examine his controversial associations with communist movements and the former Soviet Union. This Byrne is a collaboration with Student Affairs-Living Learning Communities for students who reside on the Paul Robeson floor. This Byrne is open to all students.

01:090:101 section 13

Truth or Fiction?

Leslin Charles (Rutgers Libraries)

The information age has democratized the dissemination of and access to information. Social media provides a voice to all and can blur the lines of fact and fiction. Are all tweets worth the noise they generate? How can we filter through opinions and the news media to gain accurate knowledge? This course will explore the impact of the information age on our understanding of truth. Through lectures, guest speakers, videos, role play, and discussion, students will examine various channels of information and will be required to find accurate data using a wide range of information sources.

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A Happy Child Makes a Healthy Adult
Joannis Androulakis (Biomedical Engineering)

Traumatic psychosocial events in early life, aka Adverse Childhood Experiences (ACEs: neglect, maltreatment, caregiver stress/depression, domestic/community violence) have been associated in epidemiological studies with increased lifetime risk of adverse health outcomes, including chronic non-communicable diseases such as diabetes, heart diseases and cancer, as well as psychiatric disorders. ACEs can have devastating, long-lasting effects on children’s health and well-being. In New Jersey, 41 percent of children 0-17 years have experienced some form of adversity during their early formative years. Nationwide, more than 46 percent of the 34 million children under the age of 18 are experiencing some form of adversity. This flyme seminar will explore how to engage scientists, clinicians, policy-makers, practitioners and others in addressing ACEs and helping every child have a healthy start in life.

01:090:101 section 01

Batteries, Genes, and Beyond
Alex Bertuccio (Chemical and Biochemical Engineering)

Have you ever wondered how beer is made? Maybe how a battery works? Or for that matter, how anything in your life is made? This seminar series will take a look at some of the “behind the scenes” engineering that makes products you use in your everyday life ranging from plastics to batteries to auto. While we delve into how they are made, we will also explore the engineering and science that make them what they are today. Our fundamental understanding of the links between ACE and late-life health impacts and develop evidence-based approaches to mitigate the impact of ACEs and helping every child have a healthy start in life.

01:090:101 section 09

Can Exercise Change Your Brain?
Brandon Alderman (Kinesiology and Health)

Almost everyone knows that exercise is good for them, yet most people are inactive. A more effective approach to get people off the couch and moving might be to inform them of the mental and cognitive health benefits of exercise. In this seminar, we will explore the underlying neurobiological mechanisms that help to explain the beneficial effects of exercise on brain health, covering topics from depression to ADHD to Alzheimer’s. We will also explore the paradoxical effect of physical inactivity despite scientific claims of a “feel better” phenomenon following exercise.

01:090:101 section 31

Climate Change and Water Resources
Jim Miller (Marine and Coastal Sciences)

What are the global geopolitical and policy implications of climate change? This seminar will introduce students to global climate change that is occurring in response to increasing levels of atmospheric greenhouse gases. After an introduction to the science of climate change, we will focus on potential future changes in water resources, both globally and in New Jersey, including the potential for increased floods and droughts, sea-level rise and coastal salt-water intrusion, and changes in groundwater reservoirs. Hands-on assignments will include learning about the sources of water in students’ hometowns, how the water is obtained and processed, and what local companies are doing to address climate change.

11:090:101 section 06

Energy Flow in Nature
Yogesh Jaluria (Mechanical Engineering)

Natural phenomena, from lakes, rivers and animals to climate and environmental flows, are largely governed by the flow of energy. Most of the energy comes from the Sun and we lose energy to the ambient medium. The seminar discusses how this flow of energy is critical to our survival and how it affects the Earth, the environment, and what we experience in nature. The basic aspects as well as the observed phenomena are discussed. Among the topics considered are solar flux, global climate change, maintaining internal body temperatures, temperature and pressure decrease with height, thermals and plumes due to heat input by fires and cities, and effect of temperature rise on melting of polar caps, sea levels, and storms. Use of solar, wind and geothermal systems for energy supply.

01:090:101 section 15

Biography of Women
Joan Bennett (Plant Biology and Pathology)

The language describing human anatomy and physiology was largely written by men. Perhaps for this reason, much of the medical jargon describing women’s biology can be misleading or have negative connotations. This course will give a basic overview of women’s biology and will cover male and female reproductive anatomy, the menstrual cycle and menopause, birth control, pregnancy, labor and delivery, childbirth anesthetics, lactation, sex determination, and diseases of the reproductive system. The class is meant to be a non-technical introduction to obstetrics and gynecology, with commentary of changes that have occurred in recent years. Demonstration materials will be used in each class session.

11:090:101 section 02

Big Data and Data Science
Javier Cabrera (Statistics)
Ryan Womack (Rutgers Libraries)

The world is undergoing a data revolution as big data – data collection and analytics at massive scale and increasing speed – is transforming academic research and business alike. The newly evolving discipline of data science has emerged from a fusion of statistics, computer science, and methods forged and refined by big data. This seminar explores the changes big data is bringing, from personalized genomic data, smart devices, real-time data streaming to AI-driven decision-making. We also examine the unique challenges in statistical methodology and computing that big data brings. We will discuss the new skill sets to analyze large-scale data being developed under the umbrella of data science, as well as careers in data science. Lectures and class discussions will explore the implications of big data and data science in each of these areas, and student presentations will allow each student to explore a topic of interest in more detail. On virtual field trips, students can see large-scale data in practice and meet data experts in academia and business.

01:090:101 section 11

Natural phenomena, from lakes, rivers and animals to climate and environmental flows, are largely governed by the flow of energy. Most of the energy comes from the Sun and we lose energy to the ambient medium. The seminar focuses on the importance of energy transfer on natural phenomena, considering a variety of important circumstances and problems commonly encountered in our daily lives.

11:090:101 section 12

In natural environment. Rejecting waste heat to the environment. Energy flow through natural materials like wood, rock and diamond. Effect of the atmosphere on overall energy transfer. Initiation, growth and spread of forest fires. Ice melting and solidification. Use of solar, wind and geothermal systems for energy supply. Initiative, growth and spread of forest fires. Ice melting and solidification in natural environment. Rejection of waste heat to the environment. Energy flow through natural materials like wood, rock and diamond. Effect of the atmosphere on overall energy transfer. Simple illustrative assignments will be employed to consider phenomena such as wind chill, how animals cope with extreme temperatures, ice melting, additional moisture in the air and modeling natural temperature cycles of lakes and ponds. The seminar focuses on the importance of energy transfer on natural phenomena, considering a variety of important circumstances and problems commonly encountered in our daily lives.

01:090:101 section 12
Exploring the Deep Sea
Richard Lutz (Marine and Coastal Sciences)
Costantino Vetriani (Biochemistry and Microbiology)
The seminar will focus on deep-sea exploration from the origins to present times, and discussions will be based on a mix of oral presentations and documentaries. The seminar will expose students to the deep-sea environment and its inhabitants, and it will include discussions on ongoing ecological and microbial research conducted at Rutgers in the most extreme environments on the face of the planet (e.g., deep-sea hydrothermal vents with temperatures in excess of 707°F located at depths of 1 - 2 miles beneath the ocean surface). The biotechnological potential of the deep-sea - e.g., the discovery of chemical compounds isolated from deep-sea vent organisms that may have pharmaceutical potential for curing certain types of cancer - will also be discussed. "Hands on" activities will include interactive exchanges between students and the professors focused on historical videos of deep-sea exploration. Among others, these videos include an Oscar-winning film documenting the initial biological expedition to deep-sea vents in 1979 (led by the first Director of Rutgers Institute of Marine and Coastal Sciences) and a special, large-screen Blu-ray showing for the class of an IMAX film entitled "Volcanoes of the Deep Sea" that was co-produced by Rutgers University featuring Rutgers scientists and research efforts. Rutgers was recently ranked 4th in the world among oceanographic research institutions and this seminar will expose the enrolled students to not only the cutting edge, deep-sea exploration that played a critical role over the years in helping Rutgers achieve that prominent world stature, but also to the many opportunities available to them related to oceanography at the University.
11:090:101 section 10

Finding the Shape of the Universe: Perelman and the Poincaré Conjecture
Mariano Echeverria (Mathematics)
In the year 2003, Grigory Perelman announced to the world a proof of the Poincaré conjecture, a hundred-year-old problem related to one of the most important objects in mathematics: the sphere. In fact, Perelman proved something stronger, the Poincaré Conjecture, which is central to understanding the possible shapes the universe can take. The goal of this seminar will be to put into historical perspective the Poincaré conjecture and the tools Perelman used to prove it, and how it is related to the modern quest of understanding the shape of the Universe.
11:090:101 section 51

Food for the 21st Century: Can We Feed 11 Billion People?
Paul Takhistov (Food Science)
Feeding the world's growing population is not an easy task. It is estimated that there will be 11 billion people on the planet by 2100. Can we produce enough food for all people sustainably and can we afford it? With modern science and technologies the food industry has gained a whole new set of tools to improve certain properties of food and associated processes that are necessary for food production. However, food production should never come at the expense of human health. In this seminar we will discuss principles of the food supply chain, the modern approaches to design food products, and the ways to create a sustainable food future. We will also discuss applicability of new sustainable sources of food such as algae, insects and biologically derived polysaccharides as food supplements.
11:090:101 section 03

Food: What Do We Eat? Where Does It Come From? How Do We Grow It?
Mark Robson (Plant Biology, Faculty Director, Byrne Seminars)
This five-week seminar will discuss what we eat and the origin of foods and how we grow and prepare them. We will look at the two ends of the food supply, the one billion people who suffer from lack of calories and food insecurity and the one billion people who are now clinically obese and suffer from a series of non-communicable diseases. We will talk about how food is grown, shipped, and marketed. We will discuss personal choices and better eating.
11:090:101 section 08

Global Environmental Health
Mark Robson (Plant Biology, Faculty Director, Byrne Seminars)
There are almost eight billion people in the world today and the population will grow to close to ten billion by 2050. Almost eighty five percent of the population live in developing countries. One of the challenges for this ever-growing population is providing a secure food supply. We will discuss the trends in global food production and the technology used to increase global food supply. We will also explore the ever-growing global obesity epidemic—while there are 900 million undernourished people in the world there is a larger number of people, close to 1.4 billion, who are overweight. Finally, we will look at the overall health of the global population, their jobs, their lifestyle, and the relationship to global environmental health issues, in particular those dealing with problems such as water and air pollution, food production and safety, and infectious and occupational diseases. Professor Robson will share experiences from developing countries in Southeast Asia and West Africa. Case studies and current research will be used as illustrations.
11:090:101 section 07

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Paul Takhistov (Food Science)
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11:090:101 section 03

Harry Potter and Potion-Making Science
Lei Yu (Genetics)
Humans have been using nature-made ingredients (herbs, minerals, and extracts from plants and animals) to treat diseases since ancient times. In modern day science, medicine-making is one of the largest industries and job markets for the college-educated. In this Byrne seminar, we will use examples of potion-making from the Harry Potter 7-book series as a literary platform, and introduce the knowledge and scientific approaches for medicine-making science and processes. This class will have assigned reading prior to each class, extensive in-class discussion, and writing homework. The goal is to introduce the students to medical research, and to develop skills in critical thinking and writing.
11:090:101 section 26

Health Career Cruising
Barbara Gladson (School of Health Professions)
Nancy Kirsch (School of Health Professions)
Thinking of a career in healthcare? Then this is the Byrne Seminar for you. Follow a patient’s journey to health while learning about a variety of health professions. Experience what it is like to help someone learn to walk again, to detect diseases from a small speck of blood, and to look into the heart as it delivers oxygen to our vital organs. Join us for a ten-week tour around the body while learning about the exciting professions that restore wellness and health. This course is designed to introduce the student to a wide spectrum of healthcare careers including Physical Therapy, Physician Assistant, Clinical Laboratory Services, Nutritional Sciences, Health Informatics, Psychiatric Counseling, Diagnostic Imaging, and Clinical Research. Utilizing a case-based approach, students will follow a patient through their journey of recovery while gaining introductory knowledge about the health professions and the patients that they serve. Additionally, students will be able to explore evaluation tools and treatment modalities and participate in simulated clinical experiences.
11:090:101 section 35

Hunger Frames
Chris Cuminz (New Jersey Institute for Food, Nutrition, and Health; Rutgers Health Services)
Peggy Policastro (New Jersey Institute for Food, Nutrition, and Health; Dining Services)
This class explores recent research showing that re-designing the dining environment can promote healthier eating. Each week we will discuss different dining/restaurant type venues and how the design of the operation may affect your food choices. Highlights of the class include new research on how principles from behavioral economics and social psychology can be harnessed to promote healthy eating behavior. We will also discuss how COVID-19 has impacted the eating environment.
11:090:101 section 66

Is There Life on Mars?
Max Hagblom (Marine and Coastal Sciences)
Lee Kerkhof (Genetics)
This seminar will examine the prospects of life on Mars, and elsewhere in the Universe. Not “little green men,” but microorganisms. We will explore how life is thought to have evolved on Earth and, with a focus on microbial life, identify the limitations and constraints to life as we know it. We will discuss how the NASA Exobiology program aims to understand the phylogeny and physiology of microorganisms whose characteristics reflect the nature of primitive environments or exoplanets. By examining the requirements and adaptations to extreme environments we can understand the potential of life to adapt to conditions on other planets or icy moons.
11:090:101 section 04
Let’s Clean Up New Jersey! Environmental Contamination and Clean Up in the Garden State

Donna Fennell (Environmental Sciences)
New Jersey was the first industrialized state in the union. We have a rich history of industrial production that led to development of many new products. Unfortunately, our state also suffered from environmental contamination as a result of heavy usage and manufacturing of chemicals. New Jersey is at the epicenter of the earliest applications of water and waste treatment, and environmental cleanup technologies. In this seminar, we will explore the history of environmental pollution in New Jersey, specifically focusing on contaminated sites along the Raritan and Passaic Rivers. Students will learn to use an online tool to locate and map New Jersey’s contamination. Students will continue an important Rutgers tradition by participating in a laboratory research activity on pollutant degradation and in developing ideas related to environmental cleanup.

11:090:101 section 09

Metabolism

Malcolm Watford (Nutritional Sciences)
How often have you heard the statement “I am fat because I have a slow metabolism”? In this course we will study all aspects of metabolism, and how it is studied from the first studies of Lavoisier in 1776 when he placed a guinea pig, named Gina, in a calorimeter to the present-day field of Metabolomics. We will consider how metabolism changes in conditions such as obesity, diabetes and cancer and how understanding such changes may lead to innovative treatments. Each topic will begin with some historical details and then focus the potential of individualized medicine and nutrition to maintain a healthy metabolism. Topics, together with practical demonstrations, will include: Brown Fat, the fat that makes you thin; Leptin, the cure for obesity (that wasn’t); The Warburg effect in Cancer cells; Treatment of diabetes by gene therapy to change metabolism. The answer to the opening question? A (that wasn’t); The Warburg effect in Cancer cells; Treatment of diabetes by gene therapy to change metabolism. The answer to the opening question? A

11:090:101 section 05

HONORS COLLEGE SECTION

Paperbotics and Art*

Aaron Mazzeo (Mechanical and Aerospace Engineering)
Pulp-based paper has conveyed information with printed lettering, diagrams, and illustrations for hundreds of years. In these conventional formats, the flipping or turning of pages has required a lack of life and active functionality to paper-based structures in the form of mechanical grippers, manipulators, and locomators. In this hands-on seminar, students will review state-of-the-art research in paper-based robotics (i.e., paperbotics) and active origami, and then exercise creativity to build paper-based machines that will be capable of motion and interaction with humans. By also planning the aesthetics of their projects, participants in this seminar will go beyond building gadgets to craft functional pieces of art.

11:090:101 section 14

Mosquitoes, Ticks, and Vector-borne Disease

Dina Fonseca (Entomology)
Dana Price (Entomology)
Disease transmitted by mosquitoes, ticks, and other vectors (i.e., vector-borne diseases) such as Malaria, Zika, and Lyme disease are responsible for over 700,000 human deaths annually and account for over 17 percent of all infectious disease globally. In the last 20 years, at least nine new pathogens spread to humans by these arthropod vectors were discovered in, or introduced to, the United States. This seminar will give a brief synopsis of the “arms race” that has been occurring between humans and arthropod disease vectors since the dawn of our recorded history. We will discuss the current suite of chemical and molecular tools that, together with our own behavior, form the first line of defense against what amount to the deadliest diseases on the planet. Topics covered will include: How has globalization shaped the vector-borne disease landscape? What makes a good vector? Do fleas on my cat or dog transmit any pathogens? Why are there so many mosquitoes in my yard? Students will additionally learn about the critical role that Rutgers plays in the larger NJ state and county-based mosquito control coordination network and will visit the Monmouth County tick-borne disease laboratory.

11:090:101 section 01

Perspectives on Autism in Adulthood

Vanessa Bal (Graduate School of Applied & Professional Psychology)
Christopher Manente (Graduate School of Applied & Professional Psychology)
There are currently more than 1,000,000 adults with autism living in the United States, with 50,000 more that “age-out” of their school-based educational entitlement every year. Many adults with autism are without access to high-quality services and supports. As a result, these individuals are often relegated to long adult lives characterized by social isolation, unemployment, untreated psychological and physical health conditions, and rear complete reliance on parents, family, and other caregivers to meet their basic needs. This situation represents a crisis for many adults with autism and their families. This current state of affairs is largely due to a lack of trained staff, an absence of research related to the most effective practices for supporting adults with autism across settings & contests, and few existing models for the delivery of high-quality clinical services. This seminar will examine the nature of autism and the many ways in which a diagnosis of autism can impact a person’s life throughout adulthood. Additionally, the seminar will provide a guided exploration of the historical context of society’s views and awareness related to autism and the many iterations of models for services and supports that have been implemented ranging from confinement in segregated institutional settings, other community-based models of care, and recent innovative models of services and support that are currently emerging for this population. The seminar will place a particular emphasis on the dire need for highly skilled practitioners from a variety of academic and professional disciplines to get involved in the development of innovative solutions to the multitude of challenges faced by autistic adults in their pursuit of a meaningful adult life in their communities.

11:090:101 section 48

Quantum Computing: Qubits, Entanglement, Cryptography, Black Holes and Firewalls

Stephen Schnetzer (Physics and Astronomy)
This seminar will introduce students to the ideas behind the coming quantum computing revolution. We will discuss foundations of quantum information including qubits, entanglement and modern interpretations of quantum mechanics; applications of quantum computing in cryptography and other areas; the technologies being explored for realizing quantum computing; and the quantum information aspects of black holes and gravity. In this seminar, we will discuss technical subjects but at the level of a Scientific American article. Students need only have some understanding of physics and math at the high school level.

11:090:101 section 64
Smart Eating and Living for a Healthy and Happy Life

Judith Storch (Nutritional Sciences)
Chung Yang (Pharmacy; Chemical Biology)

This course will be taught by Professors with expertise in food, nutrition, psychology and kinesiology to discuss how dietary habits, physical activity and a positive attitude can increase wellness and prevent diseases. Each session of the seminar will include lectures and discussions. The students are expected to be fully engaged by thinking about whether a certain idea can be applied to their daily lives, raising questions and participating in class discussions. Students will also participate in class exercises (or quizzes) by writing down their opinions on the subjects. In some sessions, there will be opportunities for small group discussions, student presentations and class debates. This course will also introduce our research expertise to students to stimulate their interests in multidisciplinary research and lifestyle changes toward health and happiness.

Spinal Cord Injury and Stem Cells: Pushing the Frontiers, Raising the Ethical Questions

Martin Grumet (Cell Biology and Neuroscience)
Patricia Morton (Cell Biology and Neuroscience)
Wise Young (Cell Biology and Neuroscience)

Using present day examples from stem cell and spinal cord injury research and clinical trials, this course will enable students to look beyond the headlines to the underlying facts and issues in scientific research, to critically raise and examine ethical questions, and to understand that the purpose of science is to improve the lives of people. Students are encouraged to find and report on examples in movies, television, newspapers, magazines, journals, and other contemporary sources. The class includes tours of the W. M. Keck Center and Stem Cell Research laboratories. In addition, one session will feature a guest and family dealing with spinal cord injury who will share their experiences and answer questions.

Success in Schools: Why Being Smart Isn’t Always Enough!

Timothy J. Cleary (School Psychology, GSAPP)
Ryan Kettler (School Psychology, GSAPP)

Have you ever wondered why some students struggle in school, and what can be done to help these individuals? In this seminar, we provide examples of common barriers to successful learning in schools (learning disabilities, anxiety, lack of motivation, attention disorders), and describe approaches for identifying and solving these school-based problems. Through discussion and class activities, students will be introduced to the field of school psychology and the specific roles and responsibilities of professionals (school psychologists), whose primary job is to work with teachers, families, and children to optimize learning and well-being. The content of the seminar will provide practical information that will help students not only learn about hot-topic themes in education, but also consider the substantial role that psychology can have in school settings.

The History and Future of High-Speed Passenger Trains

Doyle Knight (Mechanical and Aerospace Engineering)

Over the past fifty years, high-speed passenger trains have emerged as a critical transportation resource throughout the world. The era began with the Japanese Bullet Train (Tōkaidō Shinkansen) first service on 1 October 1964. The Japanese high-speed train system now provides over 400 million passenger trips per year, and travels at a top speed exceeding 300 km/hr. Similar high-speed passenger trains have been developed in Europe, China, and the US. This Byrne Seminar will trace the development of high-speed passenger trains and their future.

The Secret Life of Art: A Forensic Exploration of Art and Cultural Objects

Johanna Bernstein (Assistant Dean for International Programs; Chemistry and Chemical Biology)

What is that sculpture made of? How does an artist choose which materials to use? How long will these materials last? How can you tell if something is a fake? We will answer these questions by looking at art and cultural objects from the point of view of an artist or craftsman, a scientist, an art conservator, and a historian. Using a series of case studies from museums and cultural institutions around the world, this seminar will show how technological advances have influenced the creation of art and our ability to examine them. Topics will include forensic analysis and the degradation of materials, technical art history, and analytical sciences applied to the preservation and conservation of historic objects.

The Universe: What We Know and What We Don’t

Stephen Schnetzer (Physics and Astronomy)

This seminar explores what we have learned about the fundamental physics of elementary particles and cosmology over the past fifty years along with the current mysteries and unknowns. Through discussions, students will gain an idea of what fundamental physics research is and the pressing questions that we are currently striving to answer. The seminar is based on an article by Steven Weinberg from the New York Review of Books entitled “Physics: What We Do and Don’t Know.” The seminar will be at a serious level, but the use of mathematics will be kept to a minimum. Students who have taken college-prep level mathematics in high school should be well prepared.
ABOUT BYRNE SEMINARS

The First-Year Seminars at Rutgers-New Brunswick were launched in fall 2007, and the program was re-named the Byrne First-Year Seminars in fall 2008 to honor a generous donation by Mr. and Mrs. John J. Byrne. Mr. "Jack" Byrne graduated from Rutgers College in 1954. Byrne Seminars were created to realize the Byrne family vision of introducing students to research faculty in a small seminar setting at the outset of their academic journey.