OSU Oregon State University

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College of Pharmacy

OSU|OHSU COLLEGE OF PHARMACY

RESEARCH

2016 BROCHURE

Finding solutions for a healthier tomorrow


Collaborative Life Sciences Building

Table of Contents

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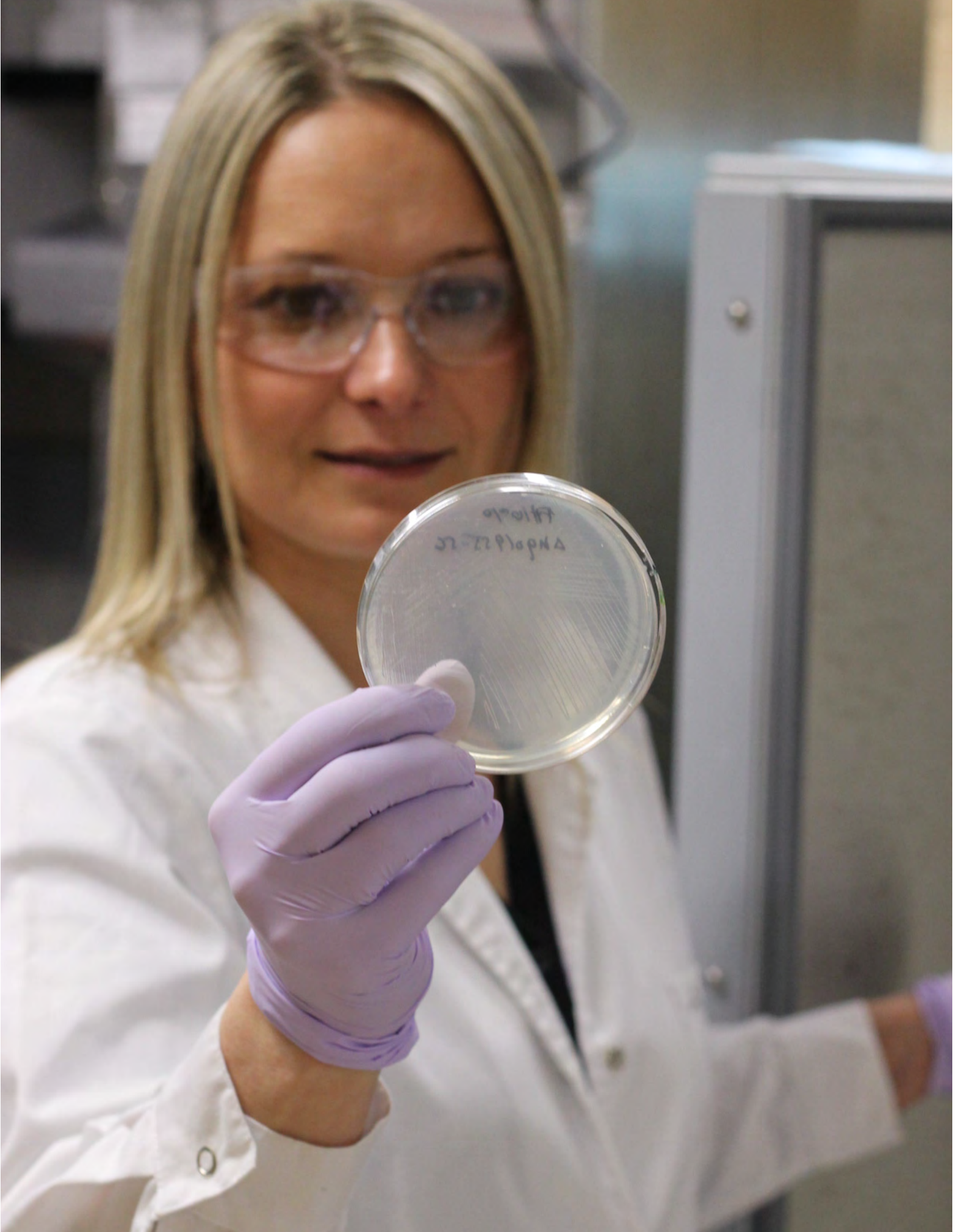


Drug Discovery Research Core

Faculty members of the Drug Discovery research core are broadly interested in bioorganic and natural product chemistry; biosynthesis of microbial secondary metabolites; and work at the interface of molecular genetics, enzymology, and chemistry toward the goal of creating and developing novel, pharmaceutically active compounds that are useful in the treatment of infectious disease and cancer. Structurally complex natural products are being isolated from diverse biological organisms living in marine and terrestrial ecosystems all over the world.

Jane Ishmael, PhD
Taifo Mahmud, PhD
Kerry McPhail, PhD
Benjamin Philmus, PhD
Phil Proteau, PhD
Aleksandra Sikora, PhD
Fred Stevens, Ph.D
Xihou Yin, PhD
Mark Zabriskie, PhD
Ryszard Zielke, PhD

Jane Ishmael, PhD

The Ishmael laboratory is focused on drug discovery, with a special interest in compounds that may have potential utility in treating CNS disorders. These studies are part of an ongoing collaboration with OSU colleagues working in the area of medicinal and natural products chemistry. Our present research is focused on identifying the mechanism of action of coibamide A, a novel antiproliferative agent isolated from a Panamanian cyanobacterium by Dr. Kerry McPhail (Pharmaceutical Sciences). We have determined that coibamide induces cell death in human glioblastoma cells via a non-apoptotic mechanism and are using a variety of biochemical, cellular and molecular biological techniques to study the influence of coibamide and other lead structures on the Phosphoinositide 3-kinase / Protein Kinase B / mammalian target of Rapamycin (PI3K/Akt/mTOR) signaling pathway. Our long-term research goal is to identify new biological targets that could be targeted for drug development in the treatment of human disease.

Taifo Mahmud, PhD

Taifo Mahmud's research interests span bioorganic and natural product chemistry; biosynthesis of microbial secondary metabolites; and the interface of molecular genetics, enzymology and chemistry to create and develop novel pharmaceutically active compounds. The group employs a multidisciplinary approach that utilizes cutting-edge technologies in molecular genetics, enzymology, and chemistry to access, study, utilize and manipulate genes and enzymes involved in the biosynthesis of bioactive natural products. Currently, a number of research projects are being pursued in his laboratory. Those include biosynthetic studies and engineered production of bioactive natural products, particularly aminocyclitol- and polyketide-derived compounds, and investigation of bioactive natural products from Indonesian rare actinomycetes.

Kerry McPhail, PhD

Structurally complex natural products from diverse biological organisms continue to be a critical source of new chemical entities that serve as lead compounds for drug development and as molecular research probes. Chemical diversity directly correlates with biological diversity, and thus phylogenetically unique organisms from unusual ecosystems are rational sources of new chemotypes with important biological activities. Taking advantage of recent advances in a range of analytical techniques, with an emphasis on nuclear magnetic resonance (NMR) spectroscopy, our laboratory focuses on the discovery and characterization of natural products relevant to cancer and infectious disease research. Three main projects are: Biologically active natural products from deep-sea vent organisms and laboratory-cultured cyanobacteria, synthesis, mechanism of action and in vivo efficacy of the Panamanian cyanobacterial metabolite coibamide A, and South African tunicates as a source of new anticancer agents.

Benjamin Philmus, PhD

The Philmus lab is interested in the discovery of bioactive natural products that can be used to treat human diseases as well as the biosynthesis and mechanisms of action of these compounds. We approach the discovery of interesting natural products using bioinformatics, genetic, molecular biology and chemical approaches. We have two major projects currently underway. The first is the prediction of gene clusters from sequenced organisms allows chemical structure prediction of the produced natural product and its mechanism of action. We have an active collaboration with the Center for Genome Resources and Biocomputing (CGRB) on campus to undertake this project. The second project involves the creation of a heterologous expression system for the supply of cyanobacterial natural products. Currently bioactive cyanobacterial compounds can be obtained by collection and isolation of environmental samples or through chemical synthesis. Establishing a heterologous host would allow bioactive compounds to be obtained in an environmentally friendly way. This project involves an active collaboration with Drs. McPhail and Ishmael for identifying and testing our produced compounds.

Philip J. Proteau, PhD

The main research projects being pursued by Philip Proteau's laboratory involve various aspects of the chemistry and biology of natural products. All of these projects are collaborative in nature. One project is aimed at the discovery of novel bioactive compounds from Indonesian soil bacteria and a second focuses on the synthesis of the antiproliferative agent coibamide A. These projects incorporate a blend of natural products chemistry, organic synthesis, and spectroscopy.

A key effort is a joint project with Drs. Zabriskie and Mahmud in collaboration with Dr. Dwi Andreas Santosa from the Indonesian Center for Biodiversity and Biotechnology. Dr. Santosa has isolated numerous novel actinomycetes (soil bacteria) from the unique Black Water Ecosystem in Kalimantan, Indonesia and we at OSU culture these bacteria and screen their extracts for biological activity, mainly focusing on antibiotic action. Active extracts are then subjected to fractionation and ultimately isolation and structure elucidation of the active components. Compounds with potential antitumor activity are further explored for mechanism of action by our pharmacology colleague, Dr. Jane Ishmael.

The second project is in collaboration with Dr. McPhail and Dr. Ishmael. Dr. McPhail's group isolated coibamide A several years ago from a cyanobacterial assemblage collected off the coast of Panama. Inconsistent natural supplies and challenges in culturing the producing organism have necessitated a synthetic route to this highly N-methylated cyclic depsipeptide natural product. In addition to targeting the natural product, we are also working on the synthesis of analogs to address structure-activity relationships. Dr. Ishmael and her students have been studying the molecular mechanism of action of coibamide and also test the synthetic compounds.

Aleksandra E. Sikora, PhD

Aleksandra E. Sikora's research is focused on how the extracellular bacterial proteome (cell envelope, surface-localized and secreted proteins) helps microbes colonize a human or other hosts and environmental niches. The constituents of the extracellular proteome are in close contact with the host tissue and thus represent attractive targets for development of new therapeutic interventions. She examines these issues using state-of-the-art genetic, molecular, biochemical and proteomic methods, and different animal models (infant and germ-free mouse, Drosophila). During her post-doctoral experience she has investigated the type II secretion (T2S) pathway that is found in many disease-causing bacteria and is responsible for the delivery of toxins and degradative enzymes to the host organism. In her studies she has used bacterial pathogens, primarily Vibrio cholerae; the most prominent of a number of Vibrio species that cause the devastating diarrheal disease, cholera. Her work has demonstrated that the T2S system is an attractive target for developing new antimicrobial agents, and accordingly she has used chemical genomics to identify compounds that interfere with the T2S process. Additionally, by employing high-throughput proteomic approaches she has discovered 16 new proteins that are translocated by the T2S machinery into the extracellular milieu. These proteins represent novel factors that might contribute to V. cholerae pathogenesis and survival in environmental niches. Her laboratory will continue research on V. cholerae and related pathogenic Vibrios, with particular interest in T2S and its secreted effectors. Moreover, she will expand her research program to another human pathogen, Neisseria gonorrhoeae, the etiological cause of the second most commonly reported infectious disease in the United States. Gonoccocal infections are often asymptomatic and in women can have devastating sequelae: pelvic inflammatory disease, ectopic pregnancy and infertility. With no effective vaccine and only a single class of antimicrobial agent currently available to treat gonoccocal infections, gonorrhoea represents a public health crisis. The Sikora lab efforts will focus on identification and elucidating novel components in N. gonorrhorhea extracellular proteome as potential targets for antimicrobials and vaccine candidates.

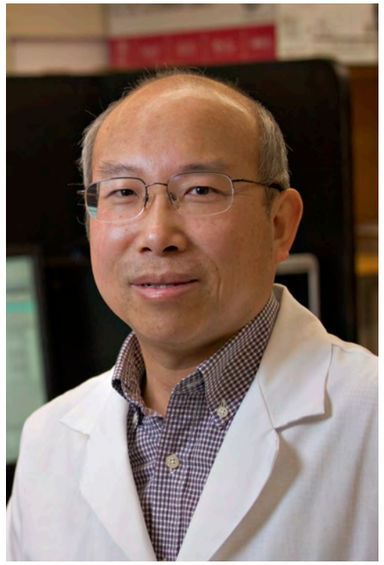
Fred Stevens, PhD

Research in the Stevens laboratory is aimed at determining the role and function of vitamins and dietary phytochemicals in human health and disease. Dr. Stevens' research is closely aligned with the research mission of the Linus Pauling Institute at OSU (http://lpi.oregonstate.edu/). Mass spectrometry-based metabolomics is a new direction in the Stevens laboratory for discovery of biological effects and mechanisms of actions.

Project 1: Xanthohumol and metabolic syndrome
Dr. Stevens and his associates have discovered that the hop natural product, xanthohumol, exerts anti-obesity and anti-hyperglycemic effects in animal models of metabolic syndrome. Current research on xanthohumol, now marketed as a dietary supplement and food additive, is focused on its fate in the human body and its effects on gene regulation relevant to lipid and glucose metabolism. Xanthohumol could earn a place in the early treatment of metabolic syndrome to prevent or retard the development of atherosclerosis and diabetes (Funding: NIH/NCCIH and Hopsteiner,Inc.).

Project 2: Vitamin C mitigates cardiovascular disease
Cardiovascular disease finds its origin in a chronic inflammatory state of the vasculature. Dr. Stevens and other investigators of the Linus Pauling Institute have shown that vitamin C supplementation reduces the formation of pro-inflammatory lipid peroxidation products in humans, which is significant because many large clinical trials have not been able to establish any effect of vitamin C on biomarkers of oxidative stress. The Stevens lab is also investigating the beneficial effects of vitamin C in the prevention of tolerance against nitrate therapy.

Other projects: 3) Brain stimulants from the medicinal herb, Centella asiatica, in the fight against Alzheimer's disease (Funding: NIH/NCCIH), and 4) Bioactives from the oilseed crop, meadowfoam (Limnanthes alba) (Funding: Natural Plant Products, Inc.).



Xihou Yin, PhD

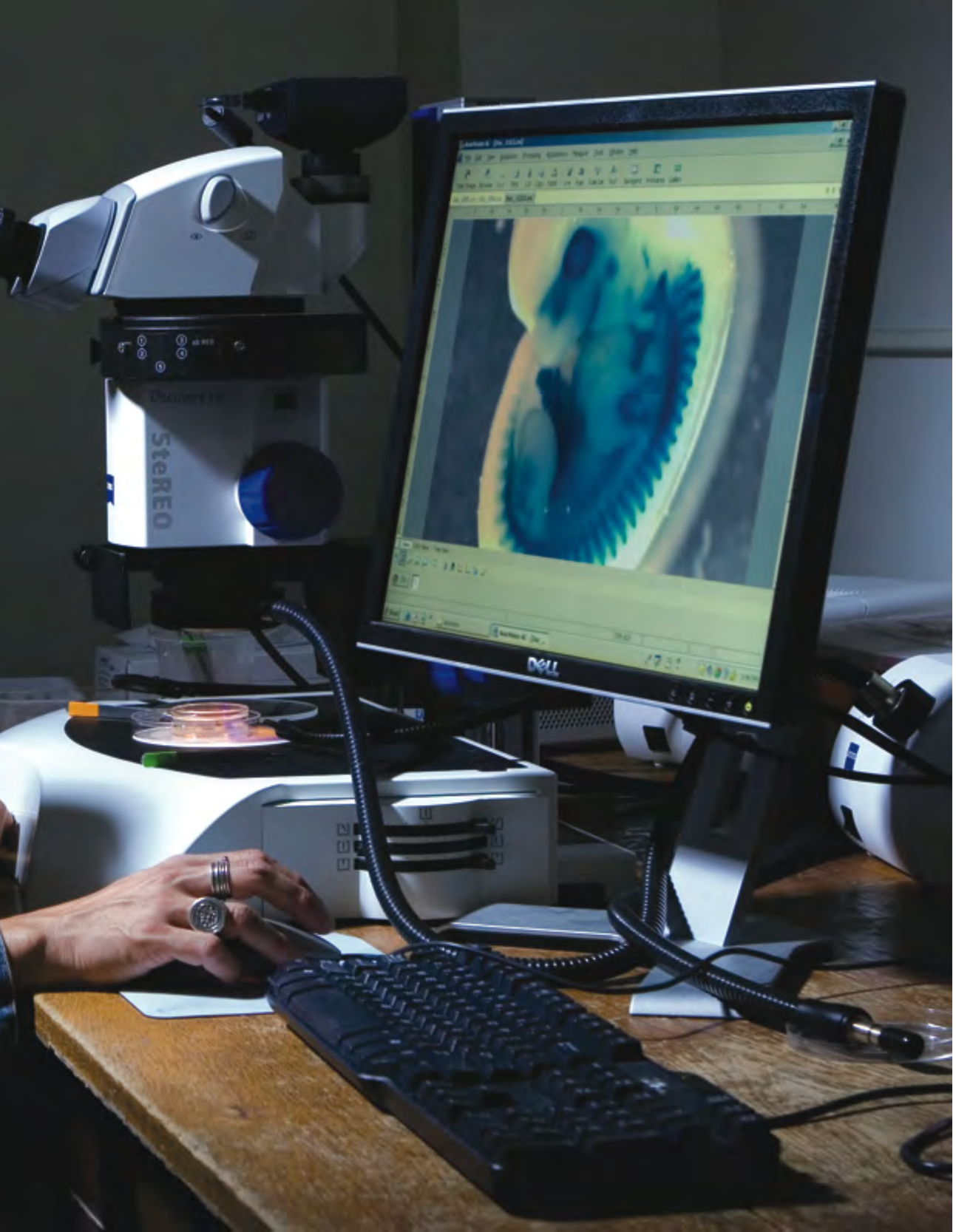
Research in the Yin lab centers on the biosynthesis and regulation of and resistance to natural products antibiotics of microbial origin. Current focus in my laboratory is on the nonribosomally generated antibacterial peptide antibiotic enduracidins (collaborated with Prof. Mark Zabriskie) and antifungal peptide antibiotic fusaricidins (collaborated with Prof. Qirong Shen). I am also interested in the biosynthesis and regulatory production of the bacterial natural products carbohydrates, which exhibit promising antimicrobial activity or immunostimulatory activity.

Mark Zabriskie, PhD

Research in the Zabriskie laboratory is highly collaborative with others in the College of Pharmacy and focuses on the discovery and development of novel bioactive natural products, particularly those that are active against organisms responsible for drug-resistant infectious diseases. Our focus centers on natural products that are produced by rare or extremophilic bacteria, or which are predicted to occur based on bacterial genome sequences but have not been isolated. We are also interested in the biosynthesis of these bacterial natural products – especially peptide and peptidyl nucleoside antibiotics. Knowledge gained from the biosynthesis studies is applied through a combination of molecular genetics and chemical methods to create analog compounds that may possess improved therapeutic properties.

Ryszard A. Zielke, PhD

Ryszard A. Zielke uses multidisciplinary approaches (high-throughput proteomics, molecular biology) to elucidate the function of conserved bacterial GTPases, particularly the translational family of GTPases. Bacterial GTPases are promiscuous targets for developing new antimicrobial agents because of their central role in many physiological processes (especially in ribosome function and biogenesis). This family consists of EF-Tu (protein that delivers charged tRNAs to the ribosome), EF-G (translocates mRNA after each round of polypeptide elongation), and LepA (translation factor that has been shown to translocate mRNA and function opposite to EF-G) and proteins yet to be assigned a definitive function such as BipA. BipA is well conserved in a wide variety of bacterial species including plant, animal and human pathogens. BipA has been implicated to play a role in crucial processes including expression of certain virulence factors in pathogenic bacteria, cell motility, resistance to antimicrobial peptides, capsule formation, and growth at low temperatures. Ryszard Zielke's work has focused on elucidating the mechanism of action of BipA. His results suggested that BipA is required for optimal translation of the alternative sigma factor, RpoS. This sigma factor is a key determinant in regulating expression of many bacterial genes during the stationary phase of growth and under stress conditions. The results of his studies shed light on the mechanism in which BipA functions as a novel regulatory protein.



Gene Regulation & Disease Research Core

Faculty members of the Gene Regulation & Disease research core are studying the mechanistic basis for control of gene expression by transcriptional regulatory proteins in developmental and pathological contexts. These studies typically require a multidisciplinary approach involving the fields of biochemistry, cell biology, epigenetics, and molecular, systems, network, and developmental biology. The core has also created numerous genetically modified mouse lines that serve as models for human diseases.

Theresa M. Filtz, PhD
Arup Indra, PhD
Gitali Indra, PhD
Chrissa Kioussi, PhD
Mark Leid, PhD
Andriy Morgun, MD, PhD

Theresa M. Filtz, PhD

Dr. Filtz's general research interest is in how a cell receives a signal and then transmits that signal to alter its function in response. She is more particularly interested in how signaling molecules/proteins are altered to change their activity. In collaboration with the lab of Dr. E. Woodcock in Melbourne, Australia, Dr. Filtz has explored the role of increased levels of phospholipase C-beta, a ubiquitous signaling enzyme, in the development of atrial fibrillation as a potential drug target. In collaboration with Dr. Mark Leid in the College of Pharmacy at OSU, Dr. Filtz is studying regulation of a tumor suppressor protein, Bcl11b. Bcl11b is critical for the proper development of T cells in the immune system; loss of Bcl11b is associated with a childhood cancer, T-cell acute lymphoblastic leukemia (T-ALL). Additionally, Dr. Filtz has been involved in screening natural product compounds for direct activity on heart cells. She has shown that two different plant products, an herbal extract of hawthorn tree, and the chemical berberine from various plant sources including Oregon grapes, both have direct activity on cardiomyocytes through classic receptor subtypes.

Gitali Indra, PhD

Research Interest: Cutaneous injury, repair and regeneration, cross talk between epidermal and mesenchymal cell, cell proliferation, migration, stem cell mobilization and cancer.

The long term goal of this lab is to elucidate the cellular and molecular mechanisms that underlie chronic wounds, inflammation and cancer for developing novel therapeutic targets for diseases and cancer and to improve human health. Transcription factor CTIP2 plays essential roles in epidermal homeostasis, barrier formation and cutaneous wound healing. In collaboration with Drs. Leid and Arup Indra in OSU, we are identifying Ctip2-regulated novel genes and signaling pathways in epidermis and hair follicle niches that can promote effective scar free wound healing. Those identified factor will serve as potential therapeutic targets for pharmacological manipulation to accelerate the wound-healing process in human patients and promote efficient wound repair and tissue remodeling. We have also set up various *in vitro* assays using spectrum of early stage and metastatic cancer cell lines to screen natural compound libraries that are obtained from our OSU Colleagues Dr. Mahmud and Dr. Stevens for potential discovery of novel anti-cancer drug leads. More specifically, we will study if the identified natural compound(s) compounds are able to target the cancer stem cells. We are also studying their effects on cell proliferation, cell cycle distribution, senescence, apoptosis, angiogenesis, and inflammation and expression levels of several bio-markers by RT-qPCR western blot and ELISA assay.

Chrissa Kioussi, PhD

The Kioussi laboratory is interested in defining the gene regulatory networks involved in muscle development and energy balance systems towards the goal of developing new strategies to treat dystrophies and metabolic syndromes. A complex transcriptional network transforms stem cells, through an organized series of embryonic cell types, into adult cell types. Genetic variation is a major cause of development, diversity and disease susceptibility. Epigenome determines the pattern of gene expression and gives the cell its distinct characteristics, function and behavior. We use a combination of biochemical, genetics, genomic and computational approaches to dissect the roles of transcription factors involved in organ development and tissue regeneration. Our studies will serve as the foundation for development of future strategies and pharmacological interventions that influence the maintenance and differentiation potential of cell populations in patients with disrupted metabolic fuel homeostasis and muscle atrophy.

Arup Indra, PhD

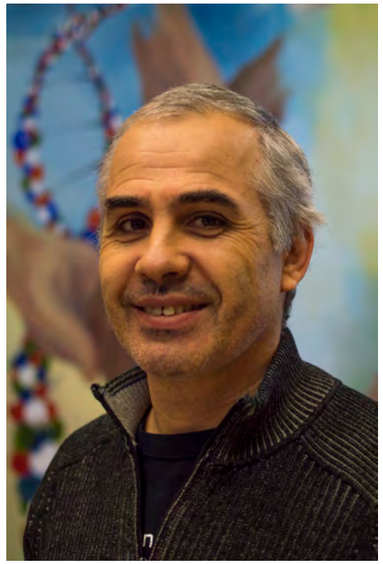
Our laboratory is investigating the mechanisms of skin development in space and time from stem cells using genetics, biochemical, cellular and molecular approaches. In collaboration with Mark Leid, we have discovered that transcriptional regulatory proteins CTP2 and CTIP1 regulate key processes during skin formation. Their mechanisms of activation in response to external cues and roles in integrating with multiple signaling cascades are areas of active research.

We have identified key factors that are essential to maintain a balance in skin, lack of which can lead to childhood mortality or can trigger onset of inflammatory skin diseases such as Atopic dermatitis (AD). The mechanisms of protective skin barrier formation and contribution of skin cells in triggering immune responses are being investigated. A lipidomics approach for profiling skin lipids and predicting AD-progression is underway in collaboration with faculties at OHSU and OSU.

We are studying the (a) mechanisms by which these developmental processes are deregulated in cancer, and (b) cell-cell signaling functional within a tumor nano-environment that contribute to cancer metastasis. We discovered that nuclear receptor (NR) signaling between skin cells contribute to formation of malignant melanomas. The crosstalk between NR signaling and other signaling pathways to mediate metastasis and de-differentiation are being investigated. We developed multiple pre-clinical models of human diseases exhibiting skin barrier defects, atopic dermatitis, skin pigmentation disorder, and for invasive melanomas. In collaboration with faculties in medicinal chemistry (Taifo Mahmud, Fred Stevens) and Pharmaceutics, we are utilizing these models to screen for natural compounds as new drug leads and develop nano-carriers for effective therapeutic intervention.

Mark Leid, PhD

The Leid laboratory is primarily focused on the in vivo role of the transcriptional regulatory protein known as Ctip2/Bcl11b. The laboratory discovered the protein and cloned the corresponding cDNA in 2000. The Leid group subsequently defined the molecular and cellular basis for the activity of this transcription factor, and demonstrated that the protein plays key roles in the development of several organ systems. The latter studies were conducted using a mouse that was conditionally null for Ctip2/Bcl11b expression, which was created in collaboration with the group of Daniel Metzger (IGBMC, Illkirch, France). Working collaboratively with the Kioussi (OSU), Indra (OSU), Kastner (IGBMC, Illkirch, France), and Rothenberg (Caltech) laboratories, the Leid laboratory has used these mice to demonstrate a crucial role for Ctip2/Bcl11b in development of teeth, skin, and T lymphocytes.



Andriy Morgun, MD, PhD

The Morgun laboratory studies biological questions ranging from how transplant rejection can be detected and discriminated from infection, to how commensal bacteria communicate with the immune system, which particular transcription factor regulates a given function, to the tumor/virus/host interaction that causes the cellular switch from benign to malignant cervical cancer. What ties all these together is a systems approach. In each case, the goal of the laboratory is to address a specific medically and/or biologically meaningful question by applying large scale tools to measure as many characteristics as possible without pre-existing biases; then to analyze the data by a variety of methods, and to follow up with further study. In these studies, we use a top-down approach, spanning a multitude of different scales and techniques, varying from molecular/genetic analysis of human diseases to in vivo and in vitro analysis of mouse models. The laboratory uses both established and novel algorithms for analysis of large-scale biological data. Most recently we have used the concept and tools of inference of causality from observational data approaching this by network analysis.

Pharmacoepidemiology Research Core

Faculty members of the Pharmacoepidemiology research core apply the principles of epidemiology and clinical pharmacology to evaluate therapeutic outcomes and medication adverse effects in patients at the population level, understand variation in treatment effects, and identify methods to improve appropriate and effective medication use. Current areas of interest include: antibiotic utilization, multidrug-resistant bacteria and healthcare-associated infections, medication use at the end of life, epidemiologic methods, healthcare delivery, and drug-induced cognitive impairment and loss of muscle mass in the geriatric population.

Jon Furuno, PhD
David Lee, PharmD, PhD
Jessina McGregor, PhD

Jon Furuno, PhD

Dr. Jon P. Furuno is an infectious disease epidemiologist and health services researcher whose primary research interests include infection prevention in acute-care and long-term care settings, treatment and management of infections in older adults, patient safety during and following transitions of care, and clinical epidemiologic methods to study infectious diseases and patient outcomes. To support these research efforts, Dr. Furuno has received federal funding from both the National Institutes of Health (NIH) and Agency for Healthcare Research and Quality as principal investigator as well as industry support and as both principal and co-investigator. Dr. Furuno's research includes optimizing antibiotic use among older adults in long-term care facilities and following transfer to acute care and improving antibiotic use for hospice and palliative care patients.
Dr. Furuno is also passionate about mentoring students, residents, fellows, and junior faculty on research projects. Current trainee projects under Dr. Furuno's mentorship include a prospective cohort study to determine the association and mechanisms between acute depressive symptoms and hospital readmission in older adults, assessing the role of environmental contamination and infection prevention interventions regarding ESBL- producing Escherichia coli and Klebsiella in intensive care unit patients, and improving antibiotic prescribing in older adults in the emergency department.

David S.H. Lee, PharmD, PhD

My research and clinical interests are in geriatrics, pharmacoepidemiology and clinical pharmacology. My research program is focused on understanding the effects of medications on physical and cognitive function in older adults. Adults over 65 years old are the largest growing segment of our population. Thus, understanding the benefits and harms of medications in older adults is important. Many medications have decreased benefits and increased harms compared to younger patients. However, aging is not a single or simple process, it is a varied and complex process that leads to a very heterogeneous population with various risk factors and multiple comorbidities. This leads to complexity in treatment approaches that makes it difficult to apply standard treatment guidelines. My research program will assist clinicians, caregivers, and patients in making more informed decisions about treatment choices.

Jessina C. McGregor, PhD

Dr. Jessina C. McGregor is an epidemiologist with research interests in the areas of healthcare-associated infections, antibiotic resistance, appropriate antibiotic use, medical informatics, and epidemiologic methods. Currently, she leads a research project on healthcare-associated community-onset urinary tract infections, which is funded by the Agency for Healthcare Research and Quality (AHRQ). Hospitalized patients are at a greater risk of acquiring certain healthcare-associated infections, such as urinary tract infections. However, with shortened lengths of hospital stays, these infections may not become apparent until after hospital discharge. Dr. McGregor's research aims to study urinary tract infections among recently hospitalized individuals at Oregon Health & Science University. Dr. McGregor's other research projects include studying patterns of antibiotic resistance and assessments of antibiotic utilization within outpatient settings in Oregon. Future project aims include the use of this research to develop electronic health record-bases interventions to improve antibiotic prescribing. In addition to her work in infectious diseases, Dr. McGregor has collaborated with other Pharmacy faculty on research projects in the areas of heart failure and mental health.

Drug Use & Pharmaceutical Health Services Research

Encouraging safe, effective, innovative and financially sustainable policies through service, drug use research and education.

Daniel Hartung, PharmD, MPH
Dean Haxby, PharmD

Daniel M. Hartung, PharmD, MPH

Daniel Hartung is a pharmacist and health services researcher who is interested in prescription drug policy, pharmacoepidemiology, and healthcare economics. Dr. Hartung's research has examined variation in drug policy and utilization within and across state Medicaid programs. He is also an investigator in the Pacific Northwest Evidence-based Practice Center where he is active in the area of systematic reviews. Currently, his work is focused in the area of prescription drug abuse, misuse, and diversion. The epidemic of opioid-related morbidity and mortality has become a public health crisis in the United States. Whether by promoting safer drug disposal methods, enhanced monitoring, or risk mitigation through naloxone dispensing, the profession of pharmacy occupies a critical role for reducing risks associated with unsafe opioid use. With funding from the CDC and the National Institute on Drug Abuse, Dr. Hartung is leading a multistate collaborative that seeks to evaluate the relationship between opioid policies in state Medicaid programs, inappropriate opioid utilization, and drug overdoses. Dr. Hartung also leads an AHRQ funded research demonstration project to develop an opioid safety toolkit for community pharmacists. The aim of the toolkit is to reduce opioid-related harms by improving skills and resources available to community pharmacist so they can effectively screen, communicate, and ultimately reduce unsafe opioid dispensing.

Dean G. Haxby, PharmD

Dean Haxby's current scholarly efforts are focused on pharmaceutical use patterns, the evaluation of drug use, policies and interventions to improve pharmaceutical use, including pharmacist delivered interventions as well as educational approaches. He is Director of the Drug Use Research and Management (DURM) program.

The Drug Use Research and Management group (DURM) at Oregon State University College of Pharmacy has an intergovernmental agreement with the Oregon Health Authority Division of Medical Assistance Programs to provide pharmacist support for the administration of pharmacy benefits and programs of the Oregon fee-for-service Medicaid program. The mission of DURM is to promote safe, effective, innovative and financially stable policies through high-quality service, drug use research and education.

Responsibilities include providing:
· Administration of the Oregon Pharmacy & Therapeutics Committee
· Evaluation of drug use and trends
· Drug policy analyses
· Evidence-based reports of new drugs and drug classes
· Drug information
· Education

Targeted Drug Delivery Research Core

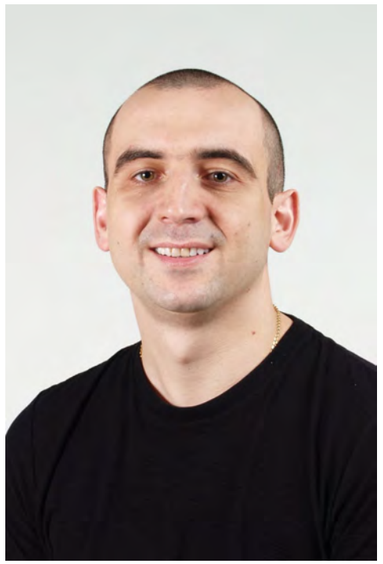
Faculty members of the Targeted Drug Delivery research core are developing novel, nanoparticle-based systems for the tumor-selective delivery of cancer chemotherapeutic agents. These nanoparticle-based delivery systems are designed to silence key cancer-driving genes in the tumors, as well as directly induce tumor cell death via induction of heat within the tumor mass.

Adam G. Alani, PhD
Guarav Sahay, PhD
Conroy Sun, PhD
Oleh Taratula, PhD
Olena Taratula, PhD

Adam G. Alani, PhD

The research in my lab revolves around the designing of biocompatible, biodegradable therapeutic polymers for specific disease states. I believe that nanotherapeutics, utilizing smart drug delivery systems, offers us new and innovative ways to treat disease states which might not be amenable to conventional therapeutics. The research in my lab focuses on designing intelligent nanocarriers to meet specific therapeutic challenges that are currently not being addressed. The design and creation of these nanotherapeutics rests not only on the polymeric chemistry needed to bring them into existence but also on a fundamental understanding of the biology and physiology of the disease state that must be considered in engineering these polymers. The design and testing of these intelligent nanocarriers will incorporate concepts from polymer chemistry, in vitro characterization techniques, passive and active targeting strategies and imagining techniques to validate and quantify the efficacy and distribution of these carriers in vivo. Thus my research will be highly multi-disciplinary involving a combination of polymer chemistry, biopharmaceutics and preclinical testing. Thus, I view my work as translating bench side research into viable treatment options that can be applied in the clinic. Currently the work in my lab is specifically focused on cancer therapy. The paradigm for treating cancers has changed considerably during the past decade due to new, emerging research suggesting alternate ways to treat and potentially cure cancers. These new paradigms include curbing the angiogenic effects of cancerous tissue, active targeting of cancerous tissue and finding ways to eliminate cancer stem cells.

Oleh Taratula, PhD



Currently, cancer is one of the biggest public health concerns due to the poor survival rate and the limited efficiency of modern cancer therapies. Conventional treatments, including chemotherapy, use high doses of toxic drugs that often induce severe adverse effects on healthy organs. Therefore, an ideal anticancer therapy would provide the targeted administration of high drug concentration directly to the tumor for the maximum treatment while limiting degradation of the drug in the systemic circulation resulting in less adverse side effects. In addition, the efficacy of cancer treatment is also limited by the rapid development of tumor resistance. The mechanisms of this resistance are common to most cancers and include “pump” and “nonpump” resistance. Consequently, only simultaneous suppression of both types of cellular resistance is capable of substantially increasing the efficacy of anticancer drugs. Finally, in order to optimize the drug delivery and enhance the efficiency of the treatment, it is highly desirable to employ clinically relevant imaging approaches for in situ monitoring of the disease progression and therapeutic responses. Therefore, my research is currently focusing on the development of multifunctional drug delivery systems for combinatorial delivery of siRNA as cancer resistance suppressors, anticancer drugs and real time imaging agents. One promising approach for overcoming the drug delivery obstacle is employing nanomaterials for carrying therapeutic agents specifically to the cancer cells. Nanoparticle interiors could be used as reservoirs for anticancer drugs and imaging agents while their large surface areas could be modified with genes and cell targeting moieties.

Guarav Sahay, PhD

Lab of Molecular, Cellular and Translational Nanotherapeutics

Dr. Gaurav Sahay is an Assistant Professor in the College of Pharmacy at Oregon State/Oregon Health Science University. Dr. Sahay's Lab is located at the new Collaborative Life Science Building on the OHSU campus in Portland. Sahay lab is developing novel nanotechnology based platforms for delivery of modified messenger RNA for therapeutic production of proteins in the treatment of lysosomal storage disorders, neuro-degenerative disorders and cancer immunotherapy. Furthermore, his lab is dissecting the molecular mechanisms involved in the intracellular trafficking and endosomal escape of nano-medicines for delivery of nucleic acids. These insights are necessary for rational design of nanoparticles for efficient drug delivery. Dr. Sahay completed his postdoctoral training in the lab of Dr. Robert Langer and Dr. Daniel Anderson at Koch Institute for Integrative Cancer Research at MIT in 2014. He received his PhD from the Lab of Dr. Alexander Kabanov at the University of Nebraska Medical Center (UNMC) in 2009. He holds a Masters in Pharmacology from UNMC and Bachelors in Pharmacy from University of Pune, India. He has 21 publications in top-tier journals including Nature Biotechnology, Nature Nanotechnology, PNAS, Advanced Materials, ACS Nano, Journal Of Controlled Release, etc. He is the winner of the 2013 American Association of Pharmaceutical Sciences Postdoctoral Fellow Award, Nature’s Sci-BX InnoCentive Challenge and 2015 T. Nagai Controlled Release Society Postdoctoral Achievement Award.

Conroy Sun, PhD

The Sun laboratory at OSU is focused on applying nanotechnology toward unanswered problems in cancer care. We are interested in developing novel nanomaterials (polymeric, inorganic and composites) that serve as platforms for tum or targeted drug delivery and molecular imaging contrast agents. In the area of nanotherapeutics, our research seeks to exploit the multifunctional capabilities of nanoparticles to combine conventional therapies, such as radiation and chemotherapy, to achieve a synergistic treatment response or combine treatment with medical imaging modalities for theranositic approaches, such as image-guided drug delivery. We are also actively developing nanoparticle-based (magnetic, optical and radioactive) molecular imaging probes and imaging techniques to evaluate in vivo tissue and cellular interactions of nanomaterials. As interdisciplinary scientists,

Olena Taratula, PhD

Olena Taratula’s research utilizes an interdisciplinary (organic chemistry, biochemistry, and nanotechnology) approach toward the development of effective nano-imaging agents and nanomedicine, particularly for cancer. This includes the development of innovative photodynamic therapy agents and efficient drug nano-carriers. The primary focus is to cure hypoxic cancer tumors by discovering efficient ways to reduce hypoxia in tumors. A good portion of this work is focused on designing and testing diagnostic and therapeutic agents that are based on molecular cages. An additional goal is to obtain a deep understanding of the host-guest interactions crucial for these applications. Another objective to assist in the accurate diagnosis of cancer is to develop innovative imaging probes by employing noble-metal nanoclusters. Multifunctional nanomaterials as targeted platforms for in vivo delivery of anti-cancer drugs and imaging agents offer control over delivery, targeting and releasing processes and thus a successful cure for cancer.

Pharmacy Practice-based Research

Lorinda Anderson, PharmD, BCPS
David Bearden, PharmD
Scott Coon, PharmD, BCPS
Natalea Suchy, PharmD, BCACP
Dean Haxby, PharmD
Megan Herink, PharmD
Adriane Irwin, PharmD
Roberto Linares, RPh
Ali Olyaei, PharmD
Stacy Ramirez, PharmD
Shannon Starwalt, PharmD
Ann Zweber, RPh

Lorinda Anderson, PharmD, BCPS

Dr. Lorinda Anderson is a Pharmacy Practice instructor where she co-coordinates the practice course in the second professional year that focuses on ambulatory care pharmacy. As a faculty member, she also serves on the admissions committee, acts as head advisor for Operation Immunization, and teaches in other courses including first year Pharmacy Practice and Therapeutics. Lorinda's practice interest is in women's health where she serves on several state committees, including the One Key Question advisory council, and on the Oregon Board of Pharmacy committee to implement and train pharmacists to prescribe birth control. Lorinda maintains practice sites at the Good Samaritan Medical Center, and at the Corvallis Community Outreach clinic.

David Bearden, PharmD

David Bearden practices in the area of adult infectious diseases. His research interests include the pharmacokinetics of antimicrobials in special populations, the approach to drug therapy in patients infected with resistant pathogens and pharmacist involvement in vaccine preventable diseases.

Natalea Braden Suchy, PharmD, BCACP

Natalea Suchy is a Clinical Assistant Professor whose interests include cultural competence and health disparities, issues she is able to address on a daily basis through co-coordinating the pharmacy practice course as well as her clinical practice sites. She currently sees patients at two federally qualified health centers, the East Linn Health Center and Lincoln Health Center. Current research projects look at teaching cultural competence to students and health care professionals. Another project will look at student attitudes toward mental health issues at different points in the curriculum. She serves as the chair of the College of Pharmacy's diversity committee as well as the faculty advisor for Operation Diabetes and SNPhA. She is also on the health disparities work group for the Intercommunity Health Network CCO.

Scott Coon, PharmD, BCPS

Scott Coon is a Clinical Assistant Professor whose interests include primary care, interprofessional education, and complementary & alternative medicine. He currently sees patients at the OHSU Richmond Family Medicine Clinic, a federally qualified health center. Current research projects aim to evaluate the impact of new clinical pharmacy services on patient outcomes. Scott served on the 2014/15 ACCP task force on emerging distance practice and technology and will serve on 2015/16 ACCP task force charged with revising the ACCP White Paper on herbal products.

Megan Herink, PharmD

Dr. Megan Herink's research is focused on improving medication management in the primary care setting and chronic disease management. In addition, she has an interest in the transition of care from the hospital to the community and the use of evidence-based clinical guidelines in hospitalized patients. She also works with the Drug Use Research and Management program, providing evidence-based reviews to guide drug policy decisions in the Oregon Medicaid program. Dr. Herink has a clinical practice with the Division of Family Medicine at OHSU and offers an internal medicine rotation to fourth-year pharmacy students.

Adriane Irwin, PharmD

Dr. Adriane Irwin joined the faculty after completing a fellowship in Ambulatory Care & Practice-Based Research. Her research background is primarily in demonstrating value of clinical pharmacy services through quality measure improvements. However, it has broadened to include strategies to financially justify clinical pharmacy services through economic modeling, optimizing the role of pharmacy technicians, and hospital budgeting methods. She maintains a clinical practice site at the Monroe Health Center, a federally qualified health center within the Community Health Centers of Benton & Linn County, for introductory and advanced pharmacy practice experiences. She also offers research opportunities for students and helps deliver the research requirement of the PGY1 residency program at Salem Hospital.

Roberto Linares, RPh

Roberto Linares is a Senior Instructor in Pharmacy Practice at Oregon State University. He co-teaches the pharmacy practice course for first year pharmacy students, which has an emphasis on self-care therapeutics and communication skills. He also teaches an elective course titled Spanish for Pharmacy Professionals. His area of practice since 1991 is community pharmacy. He is currently on the Oregon Board of Pharmacy, and the Board for Benton Hospice Service. Roberto has served as reviewer for the textbook the APhA Handbook of Nonprescription Drugs and has presented posters at national meetings on topics such as medical marijuana, the role of community pharmacists, and innovative teaching methods.

Ali Olyaei, PharmD

Ali Olyaei practices in the area of Nephrology and Transplant Medicine. His research interests include the pharmacokinetics and pharmacodynamic of immunosuppressants. He has served as a research mentor for Transplant and Nephrology Fellows, Pharmacy residents and other faculty engaged in relevant transplant and pharmacotherapy studies conducted on patients with chronic kidney disease.

Stacy Ramirez, PharmD

Dr. Stacy Ramirez joined the faculty of Oregon State University College of Pharmacy in 2006 after a career in community pharmacy that spanned 20 years. She coordinates and teaches courses in the Social and Administrative Sciences, provides lectures in pharmacy practice and co-coordinates an elective. She maintains an active ambulatory care/community practice as well as serves as the Director of Pharmacy for the Community Health Centers of Benton and Linn Counties. Her research interests are varied but generally focus on the expanded role of pharmacists in delivering care in primarily underserved populations.

Shannon Starwalt, PharmD

As Director of Introductory Pharmacy Practice Experiences, Shannon strives to provide high-quality experiential opportunities in the community, institutional, ambulatory and non-traditional areas of pharmacy practice in the first and second professional years. She maintains clinical practice sites at Good Samaritan Regional Medical Center and Medicap Pharmacy.

Ann Zweber, BS (Pharmacy), RPh

Ann Zweber, RPh, is a Senior Instructor II in Pharmacy Practice . She co-teaches the first year pharmacy practice course, which focuses on self-care therapeutics, communication skills, and introduction to chronic diseases. She currently practices in a community pharmacy. Ann served on the Oregon Board of Pharmacy for eight years and has served on several NABP committees, and the Boards of Benton Hospice Services, and Grace Center for Adult Day Services. She coauthors the chapter on Heartburn and Dyspepsia in APhA's Handbook of Nonprescription Drugs and has published articles about cultural competency and providing care to the underserved. Her current research project describes personnel training and patient education in Oregon's medical marijuana dispensaries.

Pharmacokinetic Modeling Research Core

Faculty members of the Pharmacokinetic Modeling core provide valuable information into the pharmacokinetic (PK) study design, develop a mathematical model to predict biological concentrations of drug/new molecule, and PK data interpretation for both human and veterinary studies. The purpose of the core is to assist researchers and scientists with tools that guide optimization of dosing regimen for existing drugs and refine PK studies for further development of drug candidates.

J. Mark Christensen, PhD
Myrna Munar, PhD

J. Mark Christensen, PhD

J. Mark Christensen's research takes three basic thrusts within the areas of biopharmaceutics, pharmacokinetics and drug dosage formulation. In response to the growing importance of drug therapy in animals, one research area, done in collaboration with faculty from the College of Veterinary Medicine, looks at drug disposition in animals. In another area, similar research techniques are applied to determining drug dosing and disposition in humans, how drugs are absorbed, eliminated and metabolized. The development of sustained action oral dosage forms with respect to their performance, production, and in-vivo characteristics provide the last area of research.

Myrna Munar, PharmD

Dr. Myrna Munar's clinical research background and training is in pharmacokinetic (PK) and pharmacodynamics (PD) modeling. She has utilized this expertise in PK/PD studies in adult and pediatric patient populations in the following areas: neurology, nephrology, oncology, women's health, solid organ transplantation, and infectious diseases. She serves as course master in the Advanced Pharmacokinetics course and in an elective course called PharmaCSI where students apply PK, PD, and pharmacogenomic concepts, principles and equations in workshops to investigate drug therapy misadventures and to solve mysterious drug therapy problems.

Cardiovascular Disease Research Core

Faculty members of the Cardiovascular Disease research core are primarily focused on therapeutic management of patients suffering from lipid disorders, including familial hypercholesterolemia and related conditions, as well as chronic disease management and prevention.

Harleen Singh, PharmD
Craig D. Williams, PharmD

Harleen Singh, PharmD

Dr. Singh's primary research interest is the medication management of chronic heart failure patients. Her current research involves evaluating the effectiveness of Collaborative Medication Review (CMR) in patients with chronic heart failure (CHF), as a means of improving adherence with guideline-based recommendations and potentially improving outcomes. She is currently working on a Quality Improvement Project to assess the post-discharge needs of heart failure patients during hospital admission, in order to reduce readmission rates. Dr. Singh maintains an active practice site and provides clinical support in both outpatient and inpatient heart failure care at the Veterans Medical Center in Portland. Dr. Singh, who offers both teaching and hospital rotations to fourth-year Pharm.D students, also has a keen interest in developing innovative teaching models to enhance active learning in the Pharm. D. program.

Craig D. Williams, PharmD

Dr. Williams' research is in chronic disease management and prevention with a focus on cardiovascular risk reduction. His main areas of interest include atherosclerosis, diabetes, heart failure and chronic kidney disease. He has also received past funding support from the American Lung Association for research in the field of asthma.
Dr. Williams also has an interest in practice-based research, including the transition of care between inpatient and outpatient settings. Dr. Williams' clinical practice is currently with the Division of Family Medicine at OHSU. His work in this area includes a focus on the transition of care from the hospital back into the community.

Educational Research & Scholarship of Teaching & Learning

Gary E. DeLander, PhD
Tanya L. Ostrogorsky, EdD

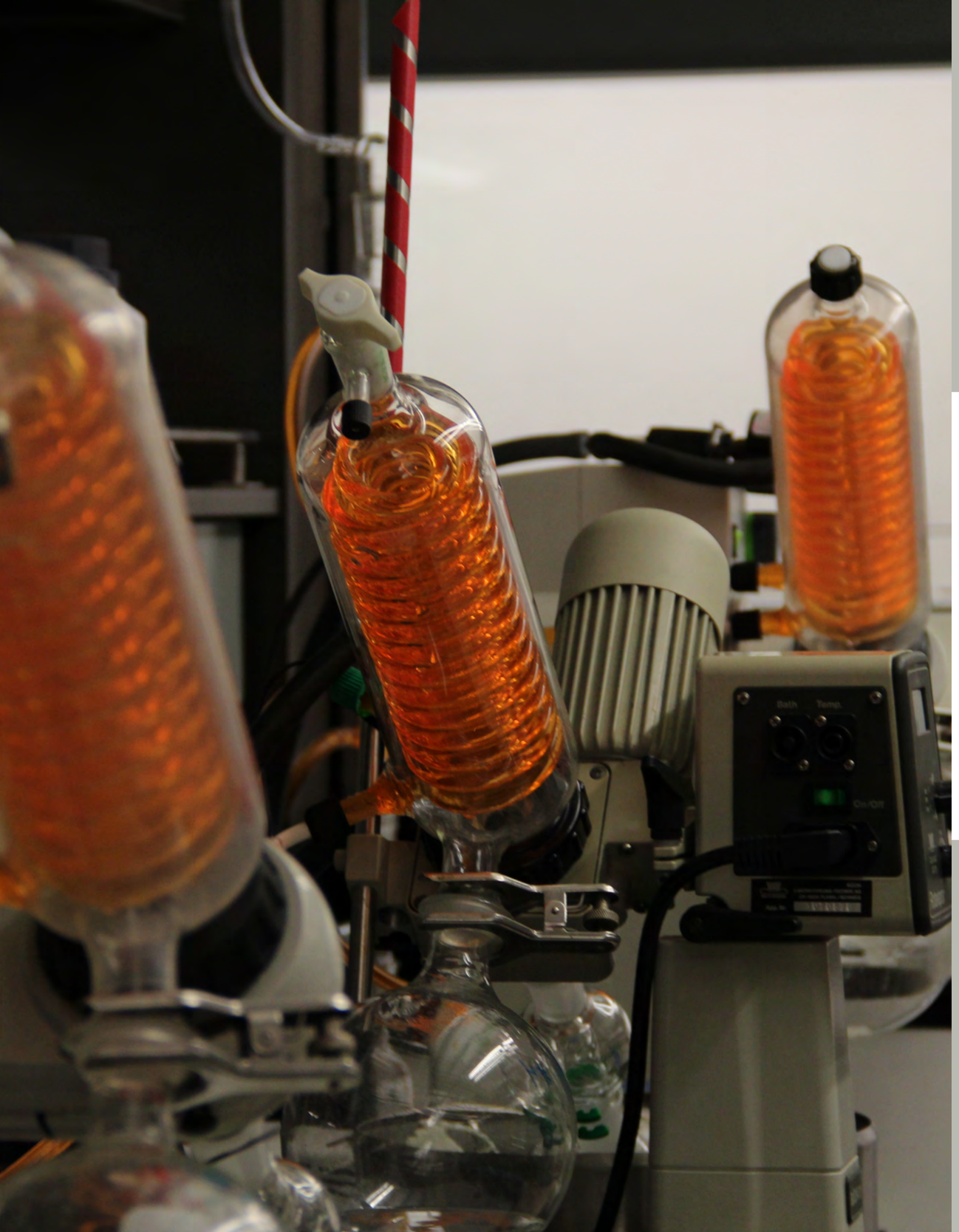
Gary E. DeLander, PhD

Dr. Gary DeLander's research interests include understanding mechanisms of pain and analgesia and, increasingly, models of pharmacy education. His recent work is focused on advances in curricular development and assessment. He has participated in national conversations that provide stimulus in advancing professional pharmacy education to support of evolving leadership roles of pharmacists in healthcare. Translating those conversations to application within professional curricula and assessment strategies is central to his scholarship.

He continues to maintain an interest in understanding how pain signals are transmitted in the body and how various drugs work in the body to inhibit pain. Previous research efforts dealt almost exclusively with sites in the spinal cord and its role in the modification of pain. More recently, his interests have expanded to explore the intersection between foundational understanding of pain inhibition and effective management of pain in patients.

Tanya L. Ostrogorsky, EdD

Dr. Ostrogorsky specializes in academic program evaluation and assessment. She focuses her research efforts in the area of educational outcomes within health science professions, with particular focus on program-specific and interprofessional educational outcomes. Additionally, she supports the development of robust program evaluation plans for co-curricular programs and other college-wide initiatives. Dr. Ostrogorsky's past research has focused on major curriculum redesign outcomes as well as role formation processes in accelerated baccalaureate nursing education. Dr. Ostrogorsky is actively serving on a federally funded HRSA grant, Interprofessional Care Access Network (I-CAN), which involves nursing, medical, dental and pharmacy students providing team-based services in the community and remains involved with the student and faculty outcome analysis of the OHSU Interprofessional Education Initiative. With Dr. Ostrogorsky's recent move to the OSU College of Pharmacy from Oregon Health & Science University, she will continue to focus in these areas as well as support faculty in the development of the scholarship of teaching and learning.



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