

Journal Of Undergraduate Chemistry Research

Completely rewritten, revised, and updated, this Sixth Edition reflects the latest technologies and applications in spectroscopy, mass spectrometry, and chromatography. It illustrates practices and methods specific to each major chemical analytical technique while showcasing innovations and trends currently impacting the field. Many of the

Heme peroxidases are widely distributed in biological systems and are involved in a wide range of processes essential for life. This book provides a comprehensive single source of information on the various aspects of heme peroxidase structure, function and mechanism of action. Chapters written and edited by worldwide experts span a range of heme peroxidases from plants, yeast, bacteria and mammals. Discussed functions of peroxidases range from cell wall synthesis, synthesis of prostaglandins, role in drug suppression of tuberculosis, and antibacterial activity. Included is a discussion of peroxidases that also act as catalases and oxygenases. Heme Peroxidases serves as an essential text for those working in industry and academia in biochemistry and metallobiology.

Undergraduate Research in Art: A Guide for Students supplies tools for scaffolding research skills, with examples of undergraduate research activities and case studies on projects in the various areas of the study of art—from art history, art education, and fine art therapy, to studio art, graphic design, and digital media. Although art degree programs don't always call it research, many undergraduate activities in art have components that could be combined into comprehensive projects. The book begins with an overview chapter, followed by seven chapters on research skills, including literature reviews, choosing topics, formulating questions, citing sources, disseminating results, and working with data and human subjects. A wide variety of subdisciplines follow in Chapters 9 through 18, with sample project ideas from each, as well as undergraduate research conference abstracts. The final chapter is an annotated guide to online resources that students can access and readily operate. Each chapter opens with inspiring quotations, and wraps up with applicable discussion questions. Professors and students can use Undergraduate Research in Art as a text or a reference book.

Undergraduate research enhances the learning experience of students in science, technology, engineering, and mathematics. Undergraduate Research in the Sciences offers a groundbreaking and practical research-based book on the topic. This comprehensive resource addresses how undergraduate research benefits undergraduate participants, including those populations that are underrepresented in the sciences; compares its benefits with other types of educational activities and experiences; and assesses its long-term value to students and faculty as both a scholarly and educational endeavor. In laying out the processes by which these benefits are achieved, this important book can assist faculty and program directors with practical guidance for design and evaluation of both new and existing undergraduate research programs. Praise for Undergraduate Research in the Sciences "This meticulous, definitive study of the effects of working with a faculty member on research as an undergraduate confirms the overall value of the experience by taking us deep into the minds and actions of participants—both faculty and students. As a result we now have many more compelling reasons to get more students involved with research

mentors and ways to optimize the benefits for all parties."—George D. Kuh, Chancellor's Professor and director, Indiana University Center for Postsecondary Research "This timely book offers a unique, comprehensive analysis of undergraduate research in the sciences, based on the voices of college students and faculty mentors who have participated in these voyages of discovery. As our nation struggles to train more scientists, this book will be a valuable resource for designing undergraduate research experiences that can build our country's capacity for discovery and innovation."—Arthur B. Ellis, Vice Chancellor for Research, University of California, San Diego "The text is written in a lucid and engaging style and will be a valuable guide to policymakers, academic administrators, and faculty members who want to find ways to engage undergraduates in the 'real work' of investigation."—Judith A. Ramaley, president, Winona State University "This book is a 'must-read' for anyone who directs undergraduates in research. It presents an impressive and rigorous body of work that brings fresh insights into the field of undergraduate research. The next generation of scientists will benefit greatly from the findings and recommendations!"—Jo Handelsman, Howard Hughes Medical Institute Professor, Yale University

Completely revised and updated, this text provides an easy-to-read guide to the concept of mass spectrometry and demonstrates its potential and limitations. Written by internationally recognised experts and utilising "real life" examples of analyses and applications, the book presents real cases of qualitative and quantitative applications of mass spectrometry. Unlike other mass spectrometry texts, this comprehensive reference provides systematic descriptions of the various types of mass analysers and ionisation, along with corresponding strategies for interpretation of data. The book concludes with a comprehensive 3000 references. This multi-disciplined text covers the fundamentals as well as recent advance in this topic, providing need-to-know information for researchers in many disciplines including pharmaceutical, environmental and biomedical analysis who are utilizing mass spectrometry

YSW publishes research articles written by undergraduates on topics related to rhetoric and writing. Articles integrate secondary sources from the area under investigation and offer primary research grounded in a theoretical framework.

Student Affairs for Academic Administrators Stylus Publishing, LLC

The aim of this volume is to share a collection of best practices currently employed by faculty and administrators to support and expand undergraduate research in chemistry at their colleges or universities. This symposium helps fill the gap between generalized or holistic assessments and individual classroom/laboratory innovations, which can serve as models for adoption. The book is divided into four parts: Early Career Experiences, Upper Division Opportunities, Program and Curricular Reform, and Mentoring and Assessment. Overall, this volume provides a snapshot of curricular and programmatic best practices in engaging a broad spectrum of students in undergraduate research.

This volume emphasizes the role of chemical education for development and, in particular, for sustainable development in Africa, by sharing experiences among specialists across the African continent and with specialists from other continents. It considers all areas and levels of chemistry education, gives specific attention to known major challenges and encourages explorations of novel approaches. The chapters in this book describe new teaching approaches, approach-explorations and in-class

activities, analyse educational challenges and possible ways of addressing them and explore cross-discipline possibilities and their potential benefits for chemistry education. This makes the volume an up to date compendium for chemistry educators and educational researchers worldwide.

Undergraduate Research in Dance: A Guide for Students supplies tools for scaffolding research skills alongside examples of undergraduate research in dance scholarship. Dance can be studied as an expressive embodied art form with physical, cognitive, and affective domains, and as an integral part of society, history, and vast areas of interdisciplinary content. To this end, the guidance provided by this book will equip future dance professionals with the means to move the field of dance forward. Chapters 1–9 guide students through the fundamentals of research methods, providing a foundation to help students get started in understanding research protocols and processes. Students will learn skills such as how to choose a research topic, refine research questions, conduct literature reviews, cite sources, synthesize and analyze data, develop conclusions and results, and present their findings. Chapters 10–19 detail forms of undergraduate research in a rich diversity of fields within dance that are taught in many collegiate dance programs including dance therapy, history, science, psychology, education, and technology, in addition to public scholarship, choreography, and interdisciplinary topics. The book also includes a final chapter which provides annotated online resources, and many of its chapters are supported by examples of abstracts of capstone projects, senior theses, and conference presentations by undergraduate researchers across the United States. Suitable for both professors and students, Undergraduate Research in Dance is an ideal reference book for any course that has a significant opportunity for the creation of new knowledge, or as an essential interdisciplinary connection between dance and other disciplines.

Technology-Enabled Blended Learning Experiences for Chemistry Education and Outreach discusses new technologies and their potential for the advancement of chemistry education, particularly in topics that are difficult to demonstrate in traditional 2d media. The book covers the theoretical background of technologies currently in use (such as virtual and augmented reality), introducing readers to the current landscape and providing a solid foundation on how technology can be usefully integrated in both learning and teaching chemistry content. Other sections cover the implementation of technology, how to design a curriculum, and how new tactics can be applied to both outreach and evaluation efforts. Case studies supplement the information presented, providing the reader with practicable examples and applications of covered theories and technologies. Drawing on the broad experiences and unique insights of a global team of authors from a whole host of different backgrounds, the book aims to stimulate readers' creativity and inspire them to find their own novel applications of the techniques highlighted in this volume. Provides detailed information on the theoretical background of technology usage in chemistry education, including discussions of augmented and virtual reality Helps readers understand available options and make informed decisions on how to best utilize technology to enhance their chemistry teaching using concepts surrounding blended learning Presents examples of theory in practice through case studies that detail completed implementations from around the world

Whether it is earning a GED, a particular skill, or technical topic for a career, taking

classes of interest, or even returning to begin a degree program or completing it, adult learning encompasses those beyond the traditional university age seeking out education. This type of education could be considered non-traditional as it goes beyond the typical educational path and develops learners that are self-initiated and focused on personal development in the form of gaining some sort of education. Essentially, it is a voluntary choice of learning throughout life for personal and professional development. While there is often a large focus towards K-12 and higher education, it is important that research also focuses on the developing trends, technologies, and techniques for providing adult education along with understanding lifelong learners' choices, developments, and needs. The Research Anthology on Adult Education and the Development of Lifelong Learners focuses specifically on adult education and the best practices, services, and educational environments and methods for both the teaching and learning of adults. This spans further into the understanding of what it means to be a lifelong learner and how to develop adults who want to voluntarily contribute to their own development by enhancing their education level or knowledge of certain topics. This book is essential for teachers and professors, course instructors, business professionals, school administrators, practitioners, researchers, academicians, and students interested in the latest advancements in adult education and lifelong learning. Undergraduate research is a uniquely American invention. The ability to enter a laboratory and to embrace the unknown world, where a discovery is just around the corner, is a transformative experience. Undergraduate research, when done right, creates an authentic research project which changes the individual who is doing the research. Early introduction to authentic research captures student interest and encourages them to continue with their studies. The difficulty of undergraduate research is scale. To be truly authentic, and thus transformative, emerging scholars in the lab need to be guided by experts who clearly care for their junior collaborators. This apprenticeship model is time consuming, absolutely essential, and difficult to scale. To provide more authentic research experiences to students, dedicated teachers have developed the idea of course-based undergraduate research experiences (CUREs). This book offers a comprehensive overview of how authentic, early research is a strategy for student success. Dr. Desmond Murray and his co-authors demonstrate the importance of early introduction to authentic research for all students, including those that are most likely to be left out during the normal sink-or-swim research university science curriculum.

In these days when every college or university needs to make the best use of resources, Student Affairs for Academic Administrators is intended to help academic administrators make the best use of one vital campus resource: student affairs. By providing this concise introduction to student affairs as a discipline and a profession, the authors of this volume provide a foundation for working together to improve the student experience and enhance learning. Since academic administrators typically come up through the faculty ranks, they are unlikely to have a good grasp of what their student affairs colleagues bring to the common work of education. To provide a better understanding, the chapters in this volume cover topics such as: • The history of student affairs, and functions typically associated with student affairs divisions; • Current thinking and research in student development theory; • Theoretical constructs underlying contemporary student affairs practice (and ways to employ these theories in

academic administration); • Diversity issues and their impact on student outcomes in the collegiate environment. After a chapter on how to build successful collaborations between academic affairs and student affairs, two final chapters explore specific examples of how such collaborations work in practice: Academic honor codes, and undergraduate research. While written for academic administrators, the book also provides valuable insights for those in student affairs seeking to improve understanding and facilitate collaboration with colleagues in academic affairs.

The Frontiers in Chemistry Editorial Office team are delighted to present the inaugural “Frontiers in Chemistry: Rising Stars” article collection, showcasing the high-quality work of internationally recognized researchers in the early stages of their independent careers. All Rising Star researchers featured within this collection were individually nominated by the Journal’s Chief Editors in recognition of their potential to influence the future directions in their respective fields. The work presented here highlights the diversity of research performed across the entire breadth of the chemical sciences, and presents advances in theory, experiment and methodology with applications to compelling problems. This Editorial features the corresponding author(s) of each paper published within this important collection, ordered by section alphabetically, highlighting them as the great researchers of the future. The Frontiers in Chemistry Editorial Office team would like to thank each researcher who contributed their work to this collection. We would also like to personally thank our Chief Editors for their exemplary leadership of this article collection; their strong support and passion for this important, community-driven collection has ensured its success and global impact. Laurent Mathey, PhD
Journal Development Manager

Standard medicinal chemistry courses and texts are organized by classes of drugs with an emphasis on descriptions of their biological and pharmacological effects. This book represents a new approach based on physical organic chemical principles and reaction mechanisms that allow the reader to extrapolate to many related classes of drug molecules. The Second Edition reflects the significant changes in the drug industry over the past decade, and includes chapter problems and other elements that make the book more useful for course instruction. New edition includes new chapter problems and exercises to help students learn, plus extensive references and illustrations. Clearly presents an organic chemist's perspective of how drugs are designed and function, incorporating the extensive changes in the drug industry over the past ten years. Well-respected author has published over 200 articles, earned 21 patents, and invented a drug that is under consideration for commercialization.

A modern and thorough treatment of the field for upper-level undergraduate and graduate courses in materials science and chemistry.

This book easily explains how to maintain a proper balance in the body, mind, and spirit to achieve a healthy, prosperous, and abundant life full of peace, happiness, and love. Do you want to boost your immune system and heal yourself of intestinal problems, excess body weight, skin conditions, chronic illnesses, among other things? Would you like to have a life with more joy and purpose, less stress, anxiety and depression? With this book, you will learn how to optimally restore and maintain your extraordinary gut microbiota by fueling your body naturally. You will recognize, without a doubt, the products and foods that really benefit you and will keep you healthy, and your meals will be super delicious and nutritious. Detoxify your body from refined carbohydrates and

added sugars, and learn about the dangers of the modern diet, which is full of harmful chemicals, additives and preservatives. Discover natural wonders and apply simple changes to your life to help you start living a healthier life. This book will help you get rid of unwanted fears, anxieties, depressions, and illnesses, with simple steps of calming the mind and reprogramming through focusing on how we really want to live. Make the change and be the example that many other people will want to follow by seeing you healthy, strong and happy. You will understand the great power of your mind and the importance of consciously creating feelings through positive thoughts and methodologies focused on personal development such as yoga, meditation, breathing, etc. Regardless of your age or what condition affects you, you can always decide to take your health in your hands and change your life in a way that allows you to overcome any circumstance in a balanced way, learning to listen to your body and understanding the true meaning of each situation. This book will help you return to the immense internal power that we all, without exception, possess!

The last decade has seen a huge interest in green organic chemistry, particularly as chemical educators look to "green" their undergraduate curricula. Detailing published laboratory experiments and proven case studies, this book discusses concrete examples of green organic chemistry teaching approaches from both lecture/seminar and practical perspective

The National Science Foundation funded a synthesis study on the status, contributions, and future direction of discipline-based education research (DBER) in physics, biological sciences, geosciences, and chemistry. DBER combines knowledge of teaching and learning with deep knowledge of discipline-specific science content. It describes the discipline-specific difficulties learners face and the specialized intellectual and instructional resources that can facilitate student understanding. Discipline-Based Education Research is based on a 30-month study built on two workshops held in 2008 to explore evidence on promising practices in undergraduate science, technology, engineering, and mathematics (STEM) education. This book asks questions that are essential to advancing DBER and broadening its impact on undergraduate science teaching and learning. The book provides empirical research on undergraduate teaching and learning in the sciences, explores the extent to which this research currently influences undergraduate instruction, and identifies the intellectual and material resources required to further develop DBER. Discipline-Based Education Research provides guidance for future DBER research. In addition, the findings and recommendations of this report may invite, if not assist, post-secondary institutions to increase interest and research activity in DBER and improve its quality and usefulness across all natural science disciplines, as well as guide instruction and assessment across natural science courses to improve student learning. The book brings greater focus to issues of student attrition in the natural sciences that are related to the quality of instruction. Discipline-Based Education Research will be of interest to educators, policy makers, researchers, scholars, decision makers in universities, government agencies, curriculum developers, research sponsors, and education advocacy groups. Published annually since 1985, the Handbook series provides a compendium of thorough and integrative literature reviews on a diverse array of topics of interest to the higher education scholarly and policy communities. Each chapter provides a comprehensive review of research findings on a selected topic, critiques the research

literature in terms of its conceptual and methodological rigor and sets forth an agenda for future research intended to advance knowledge on the chosen topic. The Handbook focuses on a comprehensive set of central areas of study in higher education that encompasses the salient dimensions of scholarly and policy inquiries undertaken in the international higher education community. Each annual volume contains chapters on such diverse topics as research on college students and faculty, organization and administration, curriculum and instruction, policy, diversity issues, economics and finance, history and philosophy, community colleges, advances in research methodology and more. The series is fortunate to have attracted annual contributions from distinguished scholars throughout the world.

Undergraduate Chemistry Education is the summary of a workshop convened in May 2013 by the Chemical Science Roundtable of the National Research Council to explore the current state of undergraduate chemistry education. Research and innovation in undergraduate chemistry education has been done for many years, and one goal of this workshop was to assist in the transfer of lessons learned from the education research community to faculty members whose expertise lies in the field of chemistry rather than in education. Through formal presentations and panel discussions, participants from academia, industry, and funding organizations explored drivers of change in science, technology, engineering and mathematics education; innovations in chemistry education; and challenges and opportunities in chemistry education reform.

Undergraduate Chemistry Education discusses large-scale innovations that are transferable, widely applicable, and/or proven successful, with specific consideration of drivers and metrics of change, barriers to implementation of changes, and examples of innovation in the classroom.

Undergraduate Research in Theatre: A Guide for Students supplies tools for scaffolding research skills alongside examples of undergraduate research in theatre and performance scholarship. The book begins with an overview of the necessity of framing theatre as undergraduate research and responding to calls for revolutionizing the discipline toward greater equity, diversity, and inclusion. Dedicated chapters for the research, skills, and methods employed by each theatre area follow: scripted theatre; devised and new works; applied theatre; scenic, costume, sound, and lighting design; and theatre theory and interdisciplinary studies. Throughout the book, undergraduate research activities are demonstrated by 36 case studies authored by undergraduates from six countries about diverse areas of theatre study. Suitable for both professors and students, Undergraduate Research in Theatre is an ideal resource for any course that has an opportunity for the creation of new knowledge or as an essential interdisciplinary connection between theatre, performance, and other disciplines.

Co-published with the Council on Undergraduate Researching alt="" src="https://stylus.pub.presswarehouse.com/uploads/71c005d5633809b40b1da36968e360e2d8276564.jpg" data-bbox="71 785 924 835"/> This book highlights the exciting work of two-year colleges to prepare students for their future careers through engagement in undergraduate research. It emerged from work in five community college systems thanks to two National Science Foundation grants the Council for Undergraduate Research received to support community colleges' efforts to establish undergraduate research programs. Chapters one, two, and three provide background information about community colleges, undergraduate research, and the systems the author worked with: California, City University of New

York, Maricopa Community College District - Arizona, Oklahoma, and Tennessee. Chapter four examines success strategies. The next five chapters look at five approaches to undergraduate research: basic/applied, course-based, community-based, interdisciplinary, and partnership research. Chapters ten, eleven and twelve discuss ways to assess and evaluate undergraduate research experiences, inclusive pedagogy, and ways to advance undergraduate research. Today there are 942 public community colleges in the United States, providing affordable access to 6.8 million students who enrolled for credit in one of the public two-year institutions in the United States. Students are more prepared for the next step in their education or careers after participating in quality UR experiences.

Encyclopedia of Food Chemistry is the ideal primer for food scientists, researchers, students and young professionals who want to acquaint themselves with food chemistry. Well-organized, clearly written, and abundantly referenced, the book provides a foundation for readers to understand the principles, concepts, and techniques used in food chemistry applications. Articles are written by international experts and cover a wide range of topics, including food chemistry, food components and their interactions, properties (flavor, aroma, texture) the structure of food, functional foods, processing, storage, nanoparticles for food use, antioxidants, the Maillard and Strecker reactions, process derived contaminants, and the detection of economically-motivated food adulteration. The encyclopedia will provide readers with an introduction to specific topics within the wider context of food chemistry, as well as helping them identify the links between the various sub-topics. Offers readers a comprehensive understanding of food chemistry and the various connections between the sub-topics Provides an authoritative introduction for non-specialists and readers from undergraduate levels and upwards Meticulously organized, with articles structured logically based on the various elements of food chemistry

Research in Science Education (RISE) Volume 6, Research Based Undergraduate Science Teaching examines research, theory, and practice concerning issues of teaching science with undergraduates. This RISE volume addresses higher education faculty and all who teach entry level science. The focus is on helping undergraduates develop a basic science literacy leading to scientific expertise. RISE Volume 6 focuses on research-based reforms leading to best practices in teaching undergraduates in science and engineering. The goal of this volume is to provide a research foundation for the professional development of faculty teaching undergraduate science. Such science instruction should have short- and longterm impacts on student outcomes. The goal was carried out through a series of events over several years. The website at <http://nseus.org> documents materials from these events. The international call for manuscripts for this volume requested the inclusion of major priorities and critical research areas, methodological concerns, and results of implementation of faculty professional development programs and reform in teaching in undergraduate science classrooms. In developing research manuscripts to be reviewed for RISE, Volume 6, researchers were asked to consider the status and effectiveness of current and experimental practices for reforming undergraduate science courses involving all undergraduates, including groups of students who are not always well represented in STEM education. To influence practice, it is important to understand how researchbased practice is made and how it is implemented. The volume should be

considered as a first step in thinking through what reform in undergraduate science teaching might look like and how we help faculty to implement such reform. Two recent initiatives from the EU, namely the Bologna Process and the Lisbon Agenda are likely to have a major influence on European Higher Education. It seems unlikely that traditional teaching approaches, which supported the elitist system of the past, will promote the mobility, widened participation and culture of 'life-long learning' that will provide the foundations for a future knowledge-based economy. There is therefore a clear need to seek new approaches to support the changes which will inevitably occur. The European Chemistry Thematic Network (ECTN) is a network of some 160 university chemistry departments from throughout the EU as well as a number of National Chemical Societies (including the RSC) which provides a discussion forum for all aspects of higher education in chemistry. This handbook is a result of one of their working groups, who identified and collated good practice with respect to innovative methods in Higher Level Chemistry Education. It provides a comprehensive overview of innovations in university chemistry teaching from a broad European perspective. The generation of this book through a European Network, with major national chemical societies and a large number of chemistry departments as members make the book unique. The wide variety of scholars who have contributed to the book, make it interesting and invaluable reading for both new and experienced chemistry lecturers throughout the EU and beyond. The book is aimed at chemistry education at universities and other higher level institutions and at all academic staff and anyone interested in the teaching of chemistry at the tertiary level. Although newly appointed teaching staff are a clear target for the book, the innovative aspects of the topics covered are likely to prove interesting to all committed chemistry lecturers.

Role of the MSEIP grant in the success of STEM undergraduate research at Queensborough Community College and beyond -- Enhancing student engagement with peer-led team learning and course-based undergraduate research experiences -- Aiming toward an effective Hispanic serving chemistry curriculum -- Computational chemistry and biology courses for undergraduates at an HBCU : cultivating a diverse computational science community -- NanoHU : a boundary-spanning education model for maximizing human and intellectual capital -- Design and implementation of a STEM student success program at Grambling State University -- The role of the ReBUILDetroit Scholars Program at Wayne State University in broadening participation in STEM -- "Using scholars programs to enhance success of underrepresented students in chemistry, biomedical sciences, and STEM" -- The MARC U*STAR Program at University of Maryland Baltimore County (UMBC) 1997-2018 -- Pathways to careers in science, engineering, and math -- Leadership dimensions for broadening participation in STEM : the role of HBCUs and MSIs -- Bloom where you are planted : a model for campus climate change to retain minoritized faculty scholars in STEM fields -- Maximizing mentoring : enhancing the impact of mentoring programs and initiatives through the Center for the Advancement of Teaching and Faculty Development at Xavier University of Louisiana -- Mentors, mentors everywhere : weaving informal and formal mentoring into a robust chemical sciences mentoring quilt -- Using technology to foster peer mentoring relationships : development of a virtual peer mentorship model for broadening participation in STEM.

When is the "right" time? How can I meet the demands of a professorship whilst caring

for a young family? Choosing to become a mother has a profound effect on the career path of women holding academic positions, especially in the physical sciences. Yet many women successfully manage to do both. In this second edition, which is a project of the Women Chemists Committee (WCC) of the American Chemical Society (ACS), 40 inspirational personal accounts describe the challenges and rewards of combining motherhood with an academic career in chemistry. The authors are all women at different stages of their career and from a range of institution types, in both tenure and non-tenure track positions. The authors include women from different racial and ethnic backgrounds, who became mothers at different stages of their career, and who have a variety of family structures. Aimed at undergraduate and graduate students of chemistry, as well as postdoctoral fellows and early career faculty, these contributions serve as examples for women considering a career in academia but worry about how this can be balanced with other important aspects of life. The authors describe how they overcame particular challenges, but also highlight aspects of the system, which could be improved to accommodate women academics, and particularly encourage more women to take on academic positions in the sciences.

This conference proceedings focuses on enabling science and mathematics practitioners and citizens to respond to the pressing challenges of global competitiveness and sustainable development by transforming research and teaching of science and mathematics. The proceedings consist of 82 papers presented at the Science and Mathematics International Conference (SMIC) 2018, organised by the Faculty of Mathematics and Natural Sciences, Universitas Negeri Jakarta, Indonesia. The proceedings are organised in four parts: Science, Science Education, Mathematics, and Mathematics Education. The papers contribute to our understanding of important contemporary issues in science, especially nanotechnology, materials and environmental science; science education, in particular, environmental sustainability, STEM and STEAM education, 21st century skills, technology education, and green chemistry; and mathematics and its application in statistics, computer science, and mathematics education.

Information about successful National Science Foundation-sponsored Chemistry Research Experience for Undergraduates (REU) programs.

When is the "right" time? How can I meet the demands of a professorship whilst caring for a young family? Choosing to become a mother has a profound effect on the career path of women holding academic positions, especially in the physical sciences. Yet many women successfully manage to do both. In this book 15 inspirational personal accounts describe the challenges and rewards of combining motherhood with an academic career in chemistry. The authors are all women at different stages of their career and from a range of colleges, in tenure and non-tenure track positions. Aimed at undergraduate and graduate students of chemistry, these contributions serve as examples for women considering a career in academia but worry about how this can be balanced with other important aspects of life. The authors describe how they overcame particular challenges, but also highlight aspects of the systems which could be improved to accommodate women academics and particularly encourage more women to take on academic positions in the sciences.

Problem solving is central to the teaching and learning of chemistry at secondary, tertiary and post-tertiary levels of education, opening to students and professional

chemists alike a whole new world for analysing data, looking for patterns and making deductions. As an important higher-order thinking skill, problem solving also constitutes a major research field in science education. Relevant education research is an ongoing process, with recent developments occurring not only in the area of quantitative/computational problems, but also in qualitative problem solving. The following situations are considered, some general, others with a focus on specific areas of chemistry: quantitative problems, qualitative reasoning, metacognition and resource activation, deconstructing the problem-solving process, an overview of the working memory hypothesis, reasoning with the electron-pushing formalism, scaffolding organic synthesis skills, spectroscopy for structural characterization in organic chemistry, enzyme kinetics, problem solving in the academic chemistry laboratory, chemistry problem-solving in context, team-based/active learning, technology for molecular representations, IR spectra simulation, and computational quantum chemistry tools. The book concludes with methodological and epistemological issues in problem solving research and other perspectives in problem solving in chemistry.

Within the growing world of social media and computer technology, it is important to facilitate collaborative knowledge building through the utilization of visual literacy, decision-making, abstract thinking, and creativity in the application of scientific teaching. *Visual Approaches to Cognitive Education With Technology Integration* is a critical scholarly resource that presents discussions on cognitive education pertaining to particular scientific fields, music, digital art, programming, computer graphics, and new media. Highlighting relevant topics such as educational visualization, art and technology integration, online learning, and multimedia technology, this book is geared towards educators, students, and researchers seeking current research on the integration of new visual education methods and technologies.

Modern technology has infiltrated many facets of society, including educational environments. Through the use of virtual learning, educational systems can become more efficient at teaching the student population and break down cost and distance barriers to reach populations that traditionally could not afford a good education. *Virtual Reality in Education: Breakthroughs in Research and Practice* is an essential reference source on the uses of virtual reality in K-12 and higher education classrooms with a focus on pedagogical and instructional outcomes and strategies. Highlighting a range of pertinent topics such as immersive virtual learning environments, virtual laboratories, and distance education, this publication is an ideal reference source for pre-service and in-service teachers, school administrators, principals, higher education faculty, K-12 instructors, policymakers, and researchers interested in virtual reality incorporation in the classroom.

Rapid developments in molecular and systems biology techniques have allowed researchers to unravel many new mechanisms through which plant cells switch over to alternative respiratory pathways. This book is a unique compendium of

