



Building Excellence in Science and Technology

December 21, 2016

PRESS RELEASE

Contact: Dr. Desmond H. Murray; (269) 757-1641; murrayd@andrews.edu

MAKING AMERICAN SCIENCE EDUCATION BUZZ AGAIN

"The Power and Promise of Early Research"

Berrien Springs, Michigan – December 21, 2016 – The late great American hero John Glenn once said, "The most important thing we can do is inspire young minds." Imagine if our 21 million American high school students were inspired and immersed in at least one year of original, hands-on research. Imagine the potential impact of even 0.1% to 1% of these students continuing to do more research in all four years of college.

This is the clear and simple yet powerful vision that the editors and authors of *The Power and Promise of Early Research* offer as a fundamental and system-wide game-changer for American science education. It is a passionate advocacy for proactively engaging students in authentic research earlier than is traditionally done. They spotlight the pedagogical, professional and practical benefits of not waiting until graduate school when students have successfully run the conventional gauntlet of required courses before they are fully immersed in doing authentic research. Rather, their collective vision for this foundational shift in when students should be allowed to start conducting research is succinctly captured in three words: *early*, *often*, and *universal*. The editors express their conviction in the introductory chapter:

"We believe that our young men and women, 18-24, across the United States can contribute to finding scientific and technological solutions to societal challenges. We can enlist them to combat diseases and addictions, to find alternative energy solutions, to create new materials for new industries, or to address the scientific and technological challenges of, for example, urbanization, healthcare, security, privacy, resource scarcity and climate change. We believe they will rise to, and even exceed, our expectations if we imagine research differently: early, often and universal."

The e-version of *Early Research* published by the American Chemical Society is currently available online on a chapter-by-chapter pay-per-view basis. It can be easily accessed at the American Chemical Society (ACS) Symposium Series e-books link: <http://pubs.acs.org/isbn/9780841231733>. The Table of Contents of the book, the first five sections (Title, Copyright, Foreword; Preface; Guest Foreword; Praise for the Power and Promise of Early Research; and the Introductory Chapter) and the Subject Index can be viewed and downloaded free of charge. Information about the book and its chapter authors can also be viewed free of charge at <http://www.bestearly.com/earlyresearchbook>.

This 13-chapter peer-reviewed book is the brainchild of Lead Editor, Dr. Desmond H. Murray of Andrews University, who for almost 20 years and with almost 1,000 students, has designed, implemented and promoted early research in both high school and college courses, as well as during the summer. His co-editors, Dr. Sherine Obare, Associate Vice-President for Research at Western Michigan

Berrien Springs, MI 49103 Phone: 269-757-1641 Fax: 269-471-3771 murrayd@andrews.edu <http://www.bestearly.com>

People First, Innovate Early



Building Excellence in Science and Technology

University and Dr. James Hageman, Special Assistant to the President at Central Michigan University, have also been in the trenches engaging a diversity of students in early research.

Early Research is chock-full of successful real world authentic research experiences of 19 authors and co-authors, including a penultimate chapter – *Lab Tales* - of personal testimonials from 14 students, past and present. They form a diverse mosaic drawn from high school, and community and four-year colleges representing rural, urban, and suburban, and different socioeconomics, ethnicities and gender.

Murray commented “this is what I live for. I believe in it deeply. Early research has occupied my full energies throughout my professional career even against the odds. I believe universal adoption of early research should be part of our long-term strategy to prepare our students for a global economy that is transitioning jobs, careers and livelihoods into more knowledge-based and innovation-focused sectors. I believe it is pedagogical malpractice, a waste of talent and a lack of vision not to nurture and engage our natural human curiosity in formalized discovery and innovation as early as possible on a system-wide scale. Today, national economic growth depends directly on human talent as never before. Our students would rise to our expectations. It is our task to challenge them towards greatness as early as possible.”

Five major insights from this book are that (a) early research is inherently and fundamentally an all-inclusive and cross-demographic metric and approach to science education, (b) early research reverses ageism in some parts of the research establishment and lifts the stultifying moratorium on young STEM talent, (c) early research compared to graduate and postgraduate research is an investment almost exclusively in “local” homegrown American students, (d) early research works – it is evidence-based, effective, adaptable and scalable. It increases student interest and retention in STEM and provides students the confidence needed to thrive in these fields, (e) universal adoption of early research can be a game-changer. These conclusions are supported in this volume by both current cognitive science research and real world best practices, one of the latter - American Chemical Society's Project SEED - has been in existence for 48 years.

It also provides copious numbers of references, resources, links, and examples for students, teachers, career counselors, educational administrators, government education officials, policy makers and granting agencies. The final chapter – *The Future of Early Research* - summarizes opportunities and recommendations for implementing best practices and building networks and infrastructure that would lead to universal adoption of early research.

Early Research features a Foreword from Professor George Shields, the 2015 American Chemical Society Awardee for Research at Undergraduate Institutions. The following are two quotations from the 28 supporting statements for *The Power and Promise of Early Research*:

“I’m happy to add my voice to those cheering the publication of this ACS symposium book, *The Power and Promise of Early Research*. I agree with the authors that an “all-hands-on-deck” approach is needed so that research is “early, often, and universal.” Implementation of the ideas in this book could be a triple win: for our students, for our discipline, and for our planet.”-

Cathy Middlecamp, Chair, Division of Chemical Education, American Chemical Society.



Building Excellence in Science and Technology

"The only way for high school students and undergraduates to really sense the dynamic nature of a career in STEM -- the uncertainties, the introspection, the triumphs, and the satisfaction of achieving - is to participate directly in research. The articles in this publication provide inspiring examples of what it takes to secure pathways for young talent." - **Dr. Margaret Daniels Tyler**, Philanthropic Advisor, Education Strategist.

"Wow! Powerful! These bios and essays cut right to the heart of what really matters in turning students on to science. Bypass all of the quick and easy popular-science factoids, all of the required science fairs and science fair projects, all of the encyclopedic memorization, and simply get students doing authentic science. It really works! These bios and essays also powerfully demonstrate that high-quality, authentic science education is no longer confined to exclusive, small and expensive, upper-level learning centers; mentors using this approach have reached and identified a deep talent pool that extends to students from all walks of life and at all levels." - **John C. Weber**, Professor of Geology, Grand Valley State University.

Early research matters. Can you feel the buzz?

###

ABOUT THE PRESS RELEASE WRITER

Desmond H. Murray is Associate Professor of Chemistry at Andrews University, Chemistry Instructor for Berrien County Math Science Center, Founder of Building Excellence in Science and Technology (BEST Early; www.bestearly.com), and Editor and Contributing Writer for Benton-Michiana Spirit Community Newspaper. Over the last 20 years teaching both high school and college he has advocated for and facilitated seamless early research. Murray has mentored about 1000 students in early research experiences he describes as "incubators of innovators." He was recognized as the 2012 College Science Teacher of the Year by the Michigan Science Teachers Association for his ongoing passion, mission and work to realize the universal adoption of early research.