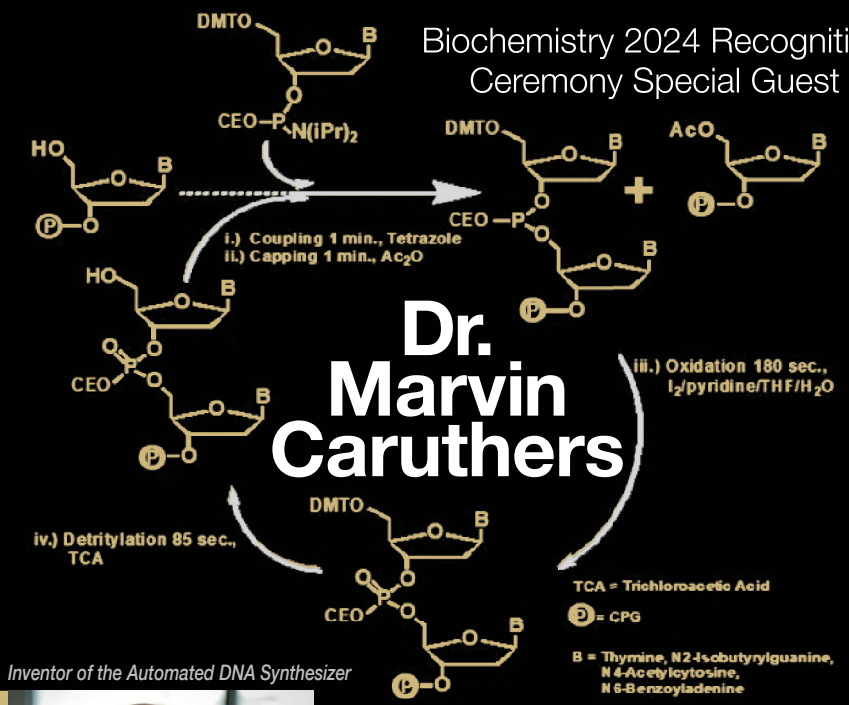
Biochemistry 2024 Recognition Ceremony Special Guest

Dr. Marvin Caruthers



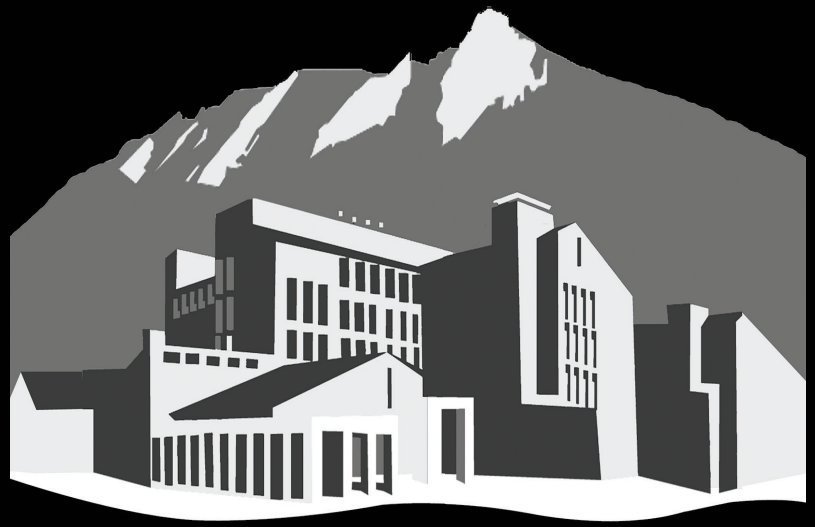
Inventor of the Automated DNA Synthesizer

Dr. Marvin Caruthers is a scientist, educator, inventor, and philanthropist. He joined the CU Boulder faculty in 1973, having the goal to improve DNA synthesis. Subsequently in the early 1980s, Dr. Caruthers invented an efficient, automated technology for synthesizing DNA that remains the leading method today. The chemical reactions that Caruthers discovered accurately and quickly assemble nucleotides into strands of DNA. With Leroy Hood, Dr. Caruthers founded Applied Biosystems, Inc. which commercialized the ABI automated DNA synthesizer, and Amgen, one of the first biotechnology companies. The "Gene Machine" gave labs across the world routine access to pure oligonucleotides, enabling the emergence of recombinant DNA technology and modern molecular biology. Sequencing the human genome, advanced biotechnology, and modern precision medicine would not have been possible without this keystone invention.

In 1994, Caruthers was elected a member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences. He received the National Medal of Science (2006), the NAS Award for Chemistry in Service to Society (2005) and the NAS Award in Chemical Sciences (2014). More recently, he was selected for the Richard N. Merkin Prize in Biomedical Technology (2023). **Dr. Caruthers will receive an Honorary Degree from the CU Board of Regents at the 2024 Commencement!**

The DNA phosphoramidite synthesis cycle *(Pictured above)*
The chemical strategy starts with phosphoramidite building blocks of protected deoxynucleosides (dA, dG, dC, dT). These are sequentially coupled to a growing oligonucleotide chain that is linked to a solid support polymer, to allow washing and addition of new reagents with each step. After completing the chain, the oligonucleotide is removed from the solid support and purified. Dr. Caruthers has also adapted this approach to the synthesis of RNA and modified nucleotides.

Biochemistry
UNIVERSITY OF COLORADO **BOULDER**



CLASS OF 2024

GRADUATE RECOGNITION CEREMONY
MAY 10, 2024

ADVANCED DEGREES

Briana Aboulache, PhD
Advisor: Karolin Luger
Defending summer 2024

Jeffre Allen, PhD
Advisor: Loren Hough
The Intrinsically Disordered M Domain of Sup35 Mediates Phase Behavior in pH-Specific Manner

Christian Brininger, PhD
Advisor: Jeffrey Cameron
Nitrogen Fixing Cyanobacteria in Calcite Precipitation

Shelby Lennon, PhD
Advisor: Robert Batey
Improving a riboswitch-based live cell RNA imaging tool

Olivia Luyties, PhD
Advisor: Dylan Taatjes
Dynamic Regulation of RNA Polymerase II by Transcription Kinases: Mechanisms and Insights

Rida Noor, MS
Advisor: Karolin Luger
Targeting PARP1-HPF1 Active Site to Improve PARP Inhibitor Design

Conner Olson, PhD
Advisor: Deborah Wuttke
The Guardians of Telomere Replication: Investigating the Interplay Between CST and RPA via Biochemical and Structural Methods

Jessica Rodino, MS
Advisor: Dylan Taatjes
NGS applications elucidate the role of CDK7 and CDK9 in global gene expression

Chelsea Toner, PhD
Advisor: Karolin Luger
Chromatin Organization in Giant Viruses: The Medusavirus Nucleosome

Stephen Upton, PhD
Advisor: Marcelo Sousa
Defending summer 2024

Cover artwork credit: Biofrontiers, University of Colorado Boulder

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Rishab Sodhi
Megan Stein
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Cortland Watson
Ezra Weible[WD]
Caitlin Welch
Lindsay Whalen
Yulin Zhu
Jared Ziv

WD: Students graduating with distinction. With Distinction honors are awarded to students who have completed a minimum of 30 credit hours at the University of Colorado with a cumulative GPA of 3.75 or higher for all coursework completed at the University of Colorado.

CEREMONY

Procession

Welcome
Dr. Kristen Roy
Director of Biochemistry Teaching Labs

Remarks
Dr. James Goodrich
Chair, Department of Biochemistry

Graduation Address
Dr. Marvin Caruthers
Distinguished Professor of Biochemistry

Hooding and Presentation of Advanced Degree Candidates

Undergraduate Student Honors & Awards

Presentation of Bachelor's Degree Candidates

Closing Remarks

Reception

LATIN HONORS

Undergraduate students receiving Latin Honors must complete significant research in collaboration with a faculty member, write a thesis and complete an oral defense.

Jesus Alicea
SUMMA CUM LAUDE
Advisor: Robert Batey
A Functional Cell-Based Genetic Screen for Variants of the B. subtilis pbuE Adenine Riboswitch that Bind Acyclovir and Theobromine

Wesley Beckham
SUMMA CUM LAUDE
Advisor: Marcelo Sousa
Expansion of a Salmonella Type III Secretion System Effector Protein Secretion Kinetics Assay

Ian Fleming
SUMMA CUM LAUDE
Advisor: Joseph Falke
Measuring The Binding Affinity of Disease Linked Ras Mutants to the Ras Binding Domain of PI3K-gamma Us ing Microscale Thermophoresis

Nikhil Gupta
SUMMA CUM LAUDE
Advisor: Karolin Luger
Structural Diversity of Bacterial Histones

Jeffrey Hage
SUMMA CUM LAUDE
Advisor: Xuedong Liu
Exploring Partially Morpholino-modified siRNAs and their Interactions with the Argonaute-2 protein

Ian Horswill
SUMMA CUM LAUDE
Advisor: Jennifer Kugel
Investigating the kinetic parameters of p53 binding to nucleosomes via single molecule Total Internal Reflection Fluorescence (smTIRF) microscopy

Emma Judge
SUMMA CUM LAUDE
Advisor: Vignesh Kasinath
Binding Affinity and E3 Ligase Activity Differences of Non-Canonical Polycomb Repressive complex 1 (ncPRC1) Constructs

Ashley Jung
SUMMA CUM LAUDE
Advisor: Xuedong Liu
Dual Roles of Antibiotics on Tangocytosis and gene transfer

Riley Long
SUMMA CUM LAUDE
Advisor: Sabrina Spencer
Determining How the Senescent Anti-Apoptotic Pathway Fits Within the Depth of Quiescence Continuum

Ryan Miller
SUMMA CUM LAUDE
Advisor: Jennifer Kugel
Investigating TFIIEβ mutation impacts on transcription complex assembly and disassembly via single molecule total internal reflection fluorescence (smT IRF) microscopy

Ana-Karina Potcoava
CUM LAUDE
Advisor: Jeffrey Cameron
Automatic Cell Segmentation with Zymomonas mobilis

Samantha Ridgeway
SUMMA CUM LAUDE
Advisor: Aaron Whiteley
Infection Detection: Elucidating the activation mechanism of a bacterial NLR-related protein

Megan Stein
CUM LAUDE
Advisor: Amy Palmer
Exploring RhoBAST Aptamer-Dye Complexes for Enhanced Metabolite Sensing

Ezra Weible
SUMMA CUM LAUDE
Advisor: Marcelo Sousa
Unfolding Kinetics and Thermodynamic Stability of Type Three Sectretion System Effectors

Lindsay Whalen
MAGNA CUM LAUDE
Advisor: Aaron Whiteley
Validating in silico predictions between bacterial NACHT proteins and their phage encoded activators

UNDERGRADUATE AWARDS & HONORS

Chancellor's Recognition Award

Awarded to graduating seniors who have maintained a 4.0 GPA their entire time at CU Boulder.

Gianni Bonnici

Ryan Miller

Timothy Hutama

Jacqueline Pankratz

American Institute of Chemists Award

Awarded in recognition of a demonstrated record of leadership ability, character, scholastic achievement, and advancement potential in the chemical professions.

Ian Fleming

Outstanding Biochemistry Graduate

Awarded in recognition of exceptional scholarly achievement, research accomplishments and community engagement.

Samantha Ridgeway