

Mit Chemical Engineering Department

CEE. Chemical Engineering Education
Advances in Chemical Engineering
Contribution from the Department of Chemical Engineering
The Chemical Engineer
Polymer Synthesis
Interfacial Transport Processes and Rheology
Creative Capital
One Hundred Years of Chemical Engineering
Chemical Engineering Faculty Directory 2001-2002
Machine Learning in Chemistry
Biomaterials Science
The Chemical Century
Handbook of Industrial Crystallization
Scaling Up
Chemical Engineering Education
Emerging Areas in Bioengineering
Research in Materials
Changing Connectomes
Chemical Engineering Progress
Numerical Methods for Chemical Engineering
Fields, Forces, and Flows in Biological Systems
Molecular Modeling and Theory in Chemical Engineering
Putting Biotechnology to Work
Electrochemical Systems
Principles of Chemical Engineering
The City We Became
Innovation, Dual Use, and Security
Insights into Chemical Engineering
The Dynamics of Local Innovation Systems
The Age of Living Machines: How Biology Will Build the Next Technology Revolution
Introduction to Chemical Engineering
Memorial Tributes
American national biography
Technology Transfer Systems in the United States and Germany
Viruses, Pandemics, and Immunity
Thermodynamics for Chemical Engineers
Principles of Bioinorganic Chemistry
Biomedical Engineering
Technology, Law, and the Working Environment
Prudent Practices in the Laboratory

CEE. Chemical Engineering Education

Advances in Chemical Engineering

Contribution from the Department of Chemical Engineering

The ability of the United States to sustain a dominant global position in biotechnology lies in maintaining its primacy in basic life-science research and developing a strong resource base for bioprocess engineering and bioproduct manufacturing. This book examines the status of bioprocessing and biotechnology in the United States; current bioprocess technology, products, and opportunities; and challenges of the future and what must be done to meet those challenges. It gives recommendations for action to provide suitable incentives to establish a national program in bioprocess-engineering research, development, education, and technology transfer.

The Chemical Engineer

This volume updates and combines two National Academy Press bestsellers--Prudent Practices for Handling Hazardous Chemicals in Laboratories and Prudent Practices for Disposal of Chemicals from Laboratories--which have served for more than a decade as leading sources of chemical safety

guidelines for the laboratory. Developed by experts from academia and industry, with specialties in such areas as chemical sciences, pollution prevention, and laboratory safety, *Prudent Practices for Safety in Laboratories* provides step-by-step planning procedures for handling, storage, and disposal of chemicals. The volume explores the current culture of laboratory safety and provides an updated guide to federal regulations. Organized around a recommended workflow protocol for experiments, the book offers prudent practices designed to promote safety and it includes practical information on assessing hazards, managing chemicals, disposing of wastes, and more. *Prudent Practices for Safety in Laboratories* is essential reading for people working with laboratory chemicals: research chemists, technicians, safety officers, chemistry educators, and students.

Polymer Synthesis

This fascinating new volume provides a comprehensive yet concise overview of the chemical aspects of some of the major innovations and changes that occurred during the 20th century, relating chemical structures and properties to real-life applications. Developed for a course taught by the author for several years at UVA, the author covers the important and consequential developments in chemistry and explains their everyday, real-life applications. These include such topics as consumer products, fossil fuel use, polymers, agriculture, food production, nutrition, explosives, and drugs. The

section Molecular Biology and Its Applications includes examples of the application of biotechnology and genetic engineering.

Interfacial Transport Processes and Rheology

Creative Capital

With more than 40 contributions from expert authors, this is an extensive overview of all important research topics in the field of bioengineering, including metabolic engineering, biotransformations and biomedical applications. Alongside several chapters dealing with biotransformations and biocatalysis, a whole section is devoted to biofuels and the utilization of biomass. Current perspectives on synthetic biology and metabolic engineering approaches are presented, involving such example organisms as *Escherichia coli* and *Corynebacterium glutamicum*, while a further section covers topics in biomedical engineering including drug delivery systems and biopharmaceuticals. The book concludes with chapters on computer-aided bioprocess engineering and systems biology. This is a part of the Advanced Biotechnology book series, covering all pertinent aspects of the field with each volume prepared by eminent scientists who are experts on the topic in question. Invaluable reading for biotechnologists and bioengineers, as well as those working in the chemical and pharmaceutical industries.

One Hundred Years of Chemical Engineering

Chemical Engineering Faculty Directory 2001-2002

Progress in the application of machine learning (ML) to the physical and life sciences has been rapid. A decade ago, the method was mainly of interest to those in computer science departments, but more recently ML tools have been developed that show significant potential across wide areas of science. There is a growing consensus that ML software, and related areas of artificial intelligence, may, in due course, become as fundamental to scientific research as computers themselves. Yet a perception remains that ML is obscure or esoteric, that only computer scientists can really understand it, and that few meaningful applications in scientific research exist. This book challenges that view. With contributions from leading research groups, it presents in-depth examples to illustrate how ML can be applied to real chemical problems. Through these examples, the reader can both gain a feel for what ML can and cannot (so far) achieve, and also identify characteristics that might make a problem in physical science amenable to a ML approach. This text is a valuable resource for scientists who are intrigued by the power of machine learning and want to learn more about how it can be applied in their own field.

Machine Learning in Chemistry

Technology, Law, and the Working Environment provides a thorough discussion of the legal issues relevant to technology-related workplace problems. It includes detailed chapters that examine occupational health and safety, toxic substance regulations, technology bargaining, and the law as it applies to the work environment. The authors explore the scope of right-to-know requirements and other worker rights, and examine the legal consequences of injury and disease for both workers and firms. After discussing the evolution of technology, work, and health since the turn of the century, the authors explore the economic and political forces that spurred the development of a variety of legal responses. Among the topics considered are: costs of occupational disease and injury market alternatives to regulating health and safety the role of economic considerations in setting standards the usefulness of economic analysis in regulatory decisionmaking the relationship between environmental regulation and workplace regulation Throughout, the text is supplemented with excerpts from key judicial decisions and selected expert commentaries that provide valuable insights into how to use the law to best effect in the workplace.

Biomaterials Science

The Chemical Century

Applications of numerical mathematics and scientific computing to chemical engineering.

Handbook of Industrial Crystallization

Venture capitalists are the handmaidens of innovation. Operating in the background, they provide the fuel needed to get fledgling companies off the ground--and the advice and guidance that helps growing companies survive their adolescence. In *Creative Capital*, Spencer Ante tells the compelling story of the enigmatic and quirky man--Georges Doriot--who created the venture capital industry. The author traces the pivotal events in Doriot's life, including his experience as a decorated brigadier general during World War II; as a maverick professor at Harvard Business School; and as the architect and founder of the first venture capital firm, American Research and Development. It artfully chronicles Doriot's business philosophy and his stewardship in startups, such as the important role he played in the formation of Digital Equipment Corporation and many other new companies that later grew to be influential and successful. An award-winning *Business Week* journalist, Ante gives us a rare look at a man who overturned conventional wisdom by proving that there is big money to be made by investing in small and risky businesses. This vivid portrait of Georges Doriot reveals the rewards that come from relentlessly pursuing what-if possibilities--and offers valuable lessons for business managers and investors alike.

Scaling Up

Chemical Engineering Education

As one of the most dynamic fields in contemporary science, bioinorganic chemistry lies at a natural juncture between chemistry, biology, and medicine. This rapidly expanding field probes fascinating questions about the uses of metal ions in nature. Respiration, metabolism, photosynthesis, gene regulation, and nerve impulse transmission are a few of the many natural processes that require metal ions, and new systems are continually being discovered. The use of unnatural metals - which have been introduced into human biology as diagnostic probes and drugs - is another active area of tremendous medical significance. This introductory text, written by two pioneering researchers, is destined to become a landmark in the field of bioinorganic chemistry through its organized unification of key topics. Accessible to undergraduates, the book provides necessary background information on coordination chemistry, biochemistry, and physical methods before delving into topics that are central to the field: What metals are chosen and how are they taken up by cells? How are the concentrations of metals controlled and utilized in cells? How do metals bind to and fold biomolecules? What principles govern electron transfer and substrate binding and activation reactions? How do proteins fine-tune the properties of metals for specific functions? For each topic discussed, fundamentals are identified and then clarified through selected examples. An extraordinarily readable writing style combines with

chapter-opening principles, study problems, and beautifully rendered two-color illustrations to make this book an ideal choice for instructors, students, and researchers in the chemical, biological, and medical communities.

Emerging Areas in Bioengineering

The second edition of this bestselling title provides the most up-to-date comprehensive review of all aspects of biomaterials science by providing a balanced, insightful approach to learning biomaterials. This reference integrates a historical perspective of materials engineering principles with biological interactions of biomaterials. Also provided within are regulatory and ethical issues in addition to future directions of the field, and a state-of-the-art update of medical and biotechnological applications. All aspects of biomaterials science are thoroughly addressed, from tissue engineering to cochlear prostheses and drug delivery systems. Over 80 contributors from academia, government and industry detail the principles of cell biology, immunology, and pathology. Focus within pertains to the clinical uses of biomaterials as components in implants, devices, and artificial organs. This reference also touches upon their uses in biotechnology as well as the characterization of the physical, chemical, biochemical and surface properties of these materials. Provides comprehensive coverage of principles and applications of all classes of biomaterials Integrates concepts of biomaterials science and biological interactions with clinical science and societal issues

including law, regulation, and ethics Discusses successes and failures of biomaterials applications in clinical medicine and the future directions of the field Cover the broad spectrum of biomaterial compositions including polymers, metals, ceramics, glasses, carbons, natural materials, and composites Endorsed by the Society for Biomaterials

Research in Materials

A framework for assessing the security risks of emerging dual-use technologies and devising tailored governance strategies is proposed and applied to contemporary case studies. Recent advances in disciplines such as biotechnology, nanotechnology, and neuropharmacology entail a “dual-use dilemma” because they promise benefits for human health and welfare yet pose the risk of misuse for hostile purposes. The emerging field of synthetic genomics, for example, can produce custom DNA molecules for life-saving drugs but also makes possible the creation of deadly viral agents for biological warfare or terrorism. The challenge for policymakers is to prevent the misuse of these new technologies without forgoing their benefits. Innovation, Dual Use, and Security offers a systematic approach for managing the dual-use dilemma. The book presents a “decision framework” for assessing the security risks of emerging technologies and fashioning governance strategies to manage those risks. This framework is applied to fourteen contemporary case studies, including synthetic genomics, DNA shuffling and directed evolution, combinatorial chemistry, protein

engineering, immunological modulation, and aerosol vaccines. The book also draws useful lessons from two historical cases: the development of the V-series nerve agents in Britain and the use and misuse of LSD by the U.S. Army and the CIA. *Innovation, Dual Use, and Security* offers a comprehensive, multifaceted introduction to the challenges of governing dual-use technologies in an era of rapid innovation. The book will be of interest to government officials and other practitioners as well as to students and scholars in security studies, science and technology studies, biology, and chemistry.

Changing Connectomes

This textbook is designed to provide the theory, methods of measurement, and principal applications of the expanding field of interfacial hydrodynamics. It is intended to serve the research needs of both academic and industrial scientists, including chemical or mechanical engineers, material and surface scientists, physical chemists, chemical and biophysicists, rheologists, physiochemical hydrodynamicists, and applied mathematicians (especially those with interests in viscous fluid mechanics and continuum mechanics). As a textbook it provides materials for a one- or two-semester graduate-level course in interfacial transport processes. It may also be noted that, while separate practical and theoretical subdivisions of material have been introduced, a kind of cross-emphasis is often stressed: (i) to the academic scientist, or the importance of understanding major applications of

interfacial transport; and (ii) to the industrial scientist, of the importance of understanding the underlying theory.

Chemical Engineering Progress

Numerical Methods for Chemical Engineering

This textbook covers the thermodynamics needed by chemical engineers both in their engineering and in their chemistry; it is intended for use in all undergraduate and some graduate-level courses. The authors emphasize a rigorous yet concise presentation of the fundamental chemical concepts governing the behavior of single and multicomponent mixtures, including phase and chemical equilibria. In the application of these concepts, consideration is given to the presentation of experimentally measured thermodynamic properties, and to their prediction for real fluids and their mixtures using methods founded on statistical mechanics. Several applications involving the transfer of heat and work that are of special importance to chemical engineers are studied in detail to show the use of thermodynamics in improving performance. The book is written in SI units and contains worked examples, exercises, and problems.

Fields, Forces, and Flows in Biological Systems

In recent years chemical engineers have become increasingly involved in the design and synthesis of new materials and products as well as the development of biological processes and biomaterials. Such applications often demand that product properties be controlled with precision. Molecular modeling, simulating chemical and molecular structures or processes by computer, aids scientists in this endeavor. Volume 28 of *Advances in Chemical Engineering* presents discussions of theoretical and computational methods as well as their applications to specific technologies.

Molecular Modeling and Theory in Chemical Engineering

This book explores major similarities and differences in the structure, conduct, and performance of the national technology transfer systems of Germany and the United States. It maps the technology transfer landscape in each country in detail, uses case studies to examine the dynamics of technology transfer in four major technology areas, and identifies areas and opportunities for further mutual learning between the two national systems.

Putting Biotechnology to Work

The field of chemical engineering is undergoing a global “renaissance,” with new processes, equipment, and sources changing literally every day. It is a dynamic, important area of study and the basis for some of the most lucrative and integral fields of

science. Introduction to Chemical Engineering offers a comprehensive overview of the concept, principles and applications of chemical engineering. It explains the distinct chemical engineering knowledge which gave rise to a general-purpose technology and broadest engineering field. The book serves as a conduit between college education and the real-world chemical engineering practice. It answers many questions students and young engineers often ask which include: How is what I studied in the classroom being applied in the industrial setting? What steps do I need to take to become a professional chemical engineer? What are the career diversities in chemical engineering and the engineering knowledge required? How is chemical engineering design done in real-world? What are the chemical engineering computer tools and their applications? What are the prospects, present and future challenges of chemical engineering? And so on. It also provides the information new chemical engineering hires would need to excel and cross the critical novice engineer stage of their career. It is expected that this book will enhance students understanding and performance in the field and the development of the profession worldwide. Whether a new-hire engineer or a veteran in the field, this is a must—have volume for any chemical engineer's library.

Electrochemical Systems

From the former president of MIT, the story of the next technology revolution, and how it will change our lives. A century ago, discoveries in physics came

together with engineering to produce an array of astonishing new technologies: radios, telephones, televisions, aircraft, radar, nuclear power, computers, the Internet, and a host of still-evolving digital tools. These technologies so radically reshaped our world that we can no longer conceive of life without them. Today, the world's population is projected to rise to well over 9.5 billion by 2050, and we are currently faced with the consequences of producing the energy that fuels, heats, and cools us. With temperatures and sea levels rising, and large portions of the globe plagued with drought, famine, and drug-resistant diseases, we need new technologies to tackle these problems. But we are on the cusp of a new convergence, argues world-renowned neuroscientist Susan Hockfield, with discoveries in biology coming together with engineering to produce another array of almost inconceivable technologies—next-generation products that have the potential to be every bit as paradigm shifting as the twentieth century's digital wonders. *The Age of Living Machines* describes some of the most exciting new developments and the scientists and engineers who helped create them. Virus-built batteries. Protein-based water filters. Cancer-detecting nanoparticles. Mind-reading bionic limbs. Computer-engineered crops. Together they highlight the promise of the technology revolution of the twenty-first century to overcome some of the greatest humanitarian, medical, and environmental challenges of our time.

Principles of Chemical Engineering

How viruses emerge to cause pandemics, how our immune system combats them, and how diagnostic tests, vaccines, and antiviral therapies work. Throughout history, humans have contended with pandemics. History is replete with references to plagues, pestilence, and contagion, but the devastation wrought by pandemics had been largely forgotten by the twenty-first century. Now, the enormous human and economic toll of the rapidly spreading COVID-19 disease offers a vivid reminder that infectious disease pandemics are one of the greatest existential threats to humanity. This book provides an accessible explanation of how viruses emerge to cause pandemics, how our immune system combats them, and how diagnostic tests, vaccines, and antiviral therapies work-- concepts that are a foundation for our public health policies.

The City We Became

A selection of papers many of which proved novel and thought-provoking and have had a considerable influence on the development of chemical engineering, chosen by Professor Danckwerts from research work conducted at Cambridge and Imperial College mainly during the years 1950-1954 and 1957-1973. They are divided into 6 sections with linking critical commentaries

Innovation, Dual Use, and Security

Insights into Chemical Engineering

This is an ideal text for an introduction to biomedical engineering. The book presents the basic science knowledge used by biomedical engineers at a level accessible to all students and illustrates the first steps in applying this knowledge to solve problems in human medicine. Biomedical engineering encompasses a range of fields of specialization including bioinstrumentation, bioimaging, biomechanics, biomaterials, and biomolecular engineering. This introduction to bioengineering assembles foundational resources from molecular and cellular biology and physiology and relates them to various sub-specialties of biomedical engineering. The first two parts of the book present basic information in molecular/cellular biology and human physiology; quantitative concepts are stressed in these sections. Comprehension of these basic life science principles provides the context in which biomedical engineers interact. The third part of the book introduces sub-specialties in biomedical engineering, and emphasizes - through examples and profiles of people in the field - the types of problems biomedical engineers solve.

The Dynamics of Local Innovation Systems

"A glorious fantasy."--Neil Gaiman Three-time Hugo Award-winning and New York Times bestselling author N.K. Jemisin crafts her most incredible novel yet, a story of culture, identity, magic, and myths in contemporary New York City. In Manhattan, a young grad student gets off the train and realizes he doesn't remember who he is, where he's from, or even his

own name. But he can sense the beating heart of the city, see its history, and feel its power. In the Bronx, a Lenape gallery director discovers strange graffiti scattered throughout the city, so beautiful and powerful it's as if the paint is literally calling to her. In Brooklyn, a politician and mother finds she can hear the songs of her city, pulsing to the beat of her Louboutin heels. And they're not the only ones. Every great city has a soul. Some are ancient as myths, and others are as new and destructive as children. New York? She's got six. For more from N. K. Jemisin, check out: *The Inheritance Trilogy* *The Hundred Thousand Kingdoms* *The Broken Kingdoms* *The Kingdom of Gods* *The Inheritance Trilogy (omnibus edition)* *Shades in Shadow: An Inheritance Triptych (e-only short fiction)* *The Awakened Kingdom (e-only novella)* *Dreamblood Duology* *The Killing Moon* *The Shadowed Sun* *The Dreamblood Duology (omnibus)* *The Broken Earth* *The Fifth Season* *The Obelisk Gate* *The Stone Sky* *How Long 'til Black Future Month? (short story collection)*

The Age of Living Machines: How Biology Will Build the Next Technology Revolution

Crystallization is an important separation and purification process used in industries ranging from bulk commodity chemicals to specialty chemicals and pharmaceuticals. In recent years, a number of environmental applications have also come to rely on crystallization in waste treatment and recycling processes. The authors provide an introduction to the

field of newcomers and a reference to those involved in the various aspects of industrial crystallization. It is a complete volume covering all aspects of industrial crystallization, including material related to both fundamentals and applications. This new edition presents detailed material on crystallization of biomolecules, precipitation, impurity-crystal interactions, solubility, and design. Provides an ideal introduction for industrial crystallization newcomers Serves as a worthwhile reference to anyone involved in the field Covers all aspects of industrial crystallization in a single, complete volume

Introduction to Chemical Engineering

One hundred years ago, in September 1888, Professor Lewis Mills Norton (1855-1893) of the Chemistry Department of the Massachusetts Institute of Technology introduced to the curriculum a course on industrial chemical practice. This was the first structured course in chemical engineering taught in a University. Ten years later, Norton's successor Frank H. Thorpe published the first textbook in chemical engineering, entitled "Outlines of Industrial Chemistry." Over the years, chemical engineering developed from a simple industrial chemical analysis of processes into a mature field. The volume presented here includes most of the commissioned and contributed papers presented at the American Chemical Society Symposium celebrating the centenary of chemical engineering. The contributions are presented in a logical way, starting first with the history of chemical engineering, followed by analyses

of various fields of chemical engineering and concluding with the history of various U.S. and European Departments of Chemical Engineering. I wish to thank the authors of the contributions/chapters of this volume for their enthusiastic response to my idea of publishing this volume and Dr. Gianni Astarita of the University of Naples, Italy, for his encouragement during the initial stages of this project.

Memorial Tributes

An up-to-date overview of the field of connectomics, introducing concepts and mechanisms underlying brain network change at different stages. The human brain undergoes massive changes during its development, from early childhood and the teenage years to adulthood and old age. Across a wide range of species, from *C. elegans* and fruit flies to mice, monkeys, and humans, information about brain connectivity (connectomes) at different stages is now becoming available. New approaches in network neuroscience can be used to analyze the topological, spatial, and dynamical organization of such connectomes. In *Changing Connectomes*, Marcus Kaiser provides an up-to-date overview of the field of connectomics and introduces concepts and mechanisms underlying brain network changes during evolution and development.

American national biography

Fields, Forces, and Flows in Biological Systems

describes the fundamental driving forces for mass transport, electric current, and fluid flow as they apply to the biology and biophysics of molecules, cells, tissues, and organs. Basic mathematical and engineering tools are presented in the context of biology and physiology. The chapters are structure

Technology Transfer Systems in the United States and Germany

This book offers a comprehensive overview of the dynamics underpinning the successful performance of local innovation systems (LIS), that is, spatial concentration of innovation activities in specific geographical areas, characterized by the synergetic co-localization of research centers, innovation-driven enterprises, large corporations and capital providers. The reader will gain a deeper knowledge of LIS theory and learn about the theoretical and empirical challenges of studying the LIS from a relational perspective. The book also provides an analytical framework to explore the level of connectivity among LIS actors through the use of social network analysis (network architecture) and second, to assess the variety of different types of relationships that local actors put in place to produce innovation within the LIS (network portfolio). More specifically, this book explores which network configuration is associated with a successful LIS by deriving evidence from the empirical study of the biopharma LIS in the Greater Boston Area (GBA), which has been exemplified as a benchmark case in terms of successful LIS performance. This book also contributes to the

theoretical debate about the optimal configuration of network structure (e.g. network closure vs. network openness). In capturing the heterogeneous nature of the LIS demography, it addresses the challenges brought about by the adoption of a holistic approach. Finally, the study provides insights into the network portfolio composition, which has been underexplored by extant literature. Besides addressing the scientific community in the field, this book will also be a valuable resource with practical implications for policymakers and those actors willing to undertake an active role in the development of an LIS in their own regions.

Viruses, Pandemics, and Immunity

Advances in Chemical Engineering

Thermodynamics for Chemical Engineers

Focusing on petroleum refining and penicillin production. this book is a tribute to the engineers who transformed laboratory reactions into large production facilities. It accompanies CHF's travelling exhibit by the same name.

Principles of Bioinorganic Chemistry

Biomedical Engineering

The new edition of the cornerstone text on electrochemistry Spans all the areas of

electrochemistry, from the basics of thermodynamics and electrode kinetics to transport phenomena in electrolytes, metals, and semiconductors. Newly updated and expanded, the Third Edition covers important new treatments, ideas, and technologies while also increasing the book's accessibility for readers in related fields. Rigorous and complete presentation of the fundamental concepts In-depth examples applying the concepts to real-life design problems Homework problems ranging from the reinforcing to the highly thought-provoking Extensive bibliography giving both the historical development of the field and references for the practicing electrochemist.

Technology, Law, and the Working Environment

This is the 17th Volume in the series Memorial Tributes compiled by the National Academy of Engineering as a personal remembrance of the lives and outstanding achievements of its members and foreign associates. These volumes are intended to stand as an enduring record of the many contributions of engineers and engineering to the benefit of humankind. In most cases, the authors of the tributes are contemporaries or colleagues who had personal knowledge of the interests and the engineering accomplishments of the deceased. Through its members and foreign associates, the Academy carries out the responsibilities for which it was established in 1964. Under the charter of the National Academy of Sciences, the National Academy

of Engineering was formed as a parallel organization of outstanding engineers. Members are elected on the basis of significant contributions to engineering theory and practice and to the literature of engineering or on the basis of demonstrated unusual accomplishments in the pioneering of new and developing fields of technology. The National Academies share a responsibility to advise the federal government on matters of science and technology. The expertise and credibility that the National Academy of Engineering brings to that task stem directly from the abilities, interests, and achievements of our members and foreign associates, our colleagues and friends, whose special gifts we remember in this book.

Prudent Practices in the Laboratory

[ROMANCE](#) [ACTION & ADVENTURE](#) [MYSTERY & THRILLER](#) [BIOGRAPHIES & HISTORY](#) [CHILDREN'S](#) [YOUNG ADULT](#) [FANTASY](#) [HISTORICAL FICTION](#) [HORROR](#) [LITERARY FICTION](#) [NON-FICTION](#) [SCIENCE FICTION](#)