

BIOTECHNOLOGY/BIOMANUFACTURING BOOKS

Jim DeKloe - Solano College

March 2016

Electronic Books:

Encyclopedia of Industrial Biotechnology: Bioprocess, Bioseparation, and Cell Technology. 7
Volume Set

John Wiley and Sons 2010

ISBN: 978-0-471-79930-6

Upstream Industrial Biotechnology (2 volumes)

Michael C. Flickinger

J Wiley - 2013

ISBN 978-1-118-13123-7

Downstream Industrial Biotechnology: Recovery and Purification

Michael C. Flickinger

J Wiley - 2013

978-1-118-13124-4.

Books to Order:

Lewin's Genes XI

Krebs, Goldstein, and Kilpatrick (Benjamin Lewin)

Jones and Bartlett Publishing- 2014 - \$ 243

ISBN 9781449659851

Molecular Biology of the Cell - Sixth Edition

Bruce Alberts, Keith Roberts, Julian Lewis, Martin Raff, David Morgan, Alexander Johnson, and
Peter Walter

Garland - 2014 - \$ 214

ISBN 978-0815344322

The above two books are top priorities for both Vacaville and the main campus.

What can you say about Genes VII or Molecular Biology of the Cell? They are both superb.

They are also encyclopedic.

Molecular Biology of the Gene – 7th Edition

James Watson, Tania Baker, Stephen P. Bell, Alexander Gann, Michael Levin, Richard Losick

Benjamin Cummings -2013 - \$ 175

ISBN 978-0321762436

This is the latest edition of Watson's (the co-discoverer of the structure of DNA) classic text.

Culture of Animal Cells: A manual of Basic Technique and Specialized Applications
Seventh Edition
Ian Freshney
John Wiley and Sons - 2016 - \$ 94
ISBN 9781118873656

Freshney's Cell Culture book remains the classic book on cell culture in the latest edition. We should order a copy for both Vacaville and Fairfield campuses.

Molecular Cell Biology – 8th Edition
Harvey Lodish, Arnold Berk, Chris Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Anjelica Amon, Matthew P. Scott, and Kelsey Martin
W. H. Freeman - 2016
ISBN: 978-1464183393

This latest edition will be released March 16, 2016.

Proteins: Biochemistry and Biotechnology 2nd Edition
Gary Walsh
J. Wiley-Blackwell - 2014
ISBN 978-0470669853

This book covers basic protein structure, the production of proteins, protein purification, protein stability, and the production and biological action of specific protein classes.

Pharmaceutical Biotechnology
Daan J. A. J. Crommelin, Robert D. Sindelar,
Springer Publishing - 2013 - \$ 80.00
ISBN: 978-1461464853

The authors wrote this excellent book to inform pharmacists and other members of that industry about the drugs that are produced by the biotechnology field. This book has Chapters on protein structure and general biochemistry, on fermentation and cell culture, on downstream protein purification processes, on formulation (a subject difficult to find materials), and on drug delivery and pharmacokinetics (again, these are areas where it is difficult to find references.) Its last Chapters cover specific pharmaceutical proteins like insulin, hematopoietic growth factors, deoxyribonuclease, tissue plasminogen activator, growth hormone, monoclonal antibodies, and vaccines. It also has a Chapter on professional education

Basic Biotechnology – Third Edition
Colin Ratledge and Bjorn Kristiansson
Cambridge University Press - 2006 - (hardcover \$ 120)
ISBN - 9780521549585

This is an excellent reference. It contains the background on the science of biotechnology as well as chapters on business topics. I believe that the Third Edition is the most recent, but the librarians should double check this. We should have a copy in Vacaville and on the main campus.

Bioprocess Engineering : Basic Concepts 2nd Edition
by Michael L. Shuler, Fikret Kargi
Prentice Hall - 2001 - \$ 89
ISBN: 978-0130819086

This classic book views biotechnology (and biology/microbiology) through the eyes of a chemical engineer. It has an excellent section on the history of the field. It also had several dense and thorough chapters on biology to bring engineers up to speed. I use this as a reference quite a bit. It is written for engineers at the senior or graduate level.

Medical Biotechnology
Bernard R. Glick, Terry L. Dolovich, and Cheryl L. Patten
ASM Press - 2014 - \$ 120
ISBN 9781555817053

Molecular Biotechnology - Fourth Edition
Principles and Applications of Recombinant DNA
Bernard R. Glick, Jack J. Pasternak, and Cheryl L. Patten
ASM Press - 2010 - \$ 120
ISBN 9781555814984

This book is well written, but the level may prove challenging for lower division students. Their inclusion of the discussion of key historic papers from the scientific literature adds an interesting and important component. It has very good sections on fermentation and cell culture, a section on government regulation of the industry, and a section on patents. It does explore the business end of biotechnology some.

Bioethics and Medical Ethics

Ethical Issues in Biotechnology
Richard Sherlock
Rowman & Littlefield Publishers 2002
9780742513778

Principles of Biomedical Ethics, 7th Edition
Tom Beauchamp & James Childress
Oxford University Press – 2012
ISBN 9780199924585

Bioethics: An Anthology, 3rd Edition,
Helga Kuhse, Udo Schüklenk, Peter Singer (Eds.)
Wiley – Blackwell 2015
ISBN 978-1-118-94152-2

Fundamental Immunology – 7th Edition
William Paul
LWW - 2012
ISBN: 978-1451117837

Engineering

Measurement, Monitoring, Modelling and Control of Bioprocesses
Carl-Fredrik Mandenius, Nigel J Titchener-Hooker (Eds.)
Springer-Verlag (2015)
ISBN: 9783642368370
\$ 369

Bioprocess Monitoring and Control
Marie-Noelle A Pons
John Wiley and Sons – 1995
9780471037149

Computational Intelligence Techniques for Bioprocess Modelling, Supervision and Control
Maria Carmo Nicoletti
Springer 2014
ISBN 978-3642424861 - \$ 269

Practical Design of Experiments: DoE Made Easy!
Colin Hardwick
CreateSpace Independent Publishing Platform; 1 edition - 2013
978-1482760996

A DOE Handbook: A Simple Approach to Basic Statistical Design of Experiments,
Bert Gunter, Daniel Coleman
CreateSpace Independent Publishing Platform; 1 edition - 2014
ISBN 978-1497511903

Design and Analysis of Experiments – 8th Edition
Douglas C. Montgomery
J. Wiley - 2012
ISBN 978-1118146927

Student Solutions Manual Design and Analysis of Experiments, 8e Student Solutions
Douglas C. Montgomery, Lisa Custer and Daniel R. McCarville
J. Wiley - 2012
ISBN 978-1118388198

Bioprocess Engineering Principles, 2nd Edition
Pauline M. Doran
Academic Press – 2012
ISBN 978-0122208515

Cell Culture Technology for Pharmaceutical and Cell-Based Therapies (Biotechnology and Bioprocessing)
Sadettin Ozturk and Wei-Shou Hu
CRC Press

ISBN 9780824753344

Cell Culture Bioprocess Engineering
Wei-Shou Hu
CRC Press
ISBN 978-0985662608

These books are already in the collection on the main campus:

Biopharmaceuticals: Biochemistry and Biotechnology
Gary Walsh
J. Wiley Press - 1998
ISBN 0471977896 (paper) - \$ 69.95 0471977888 (hardcover) - \$ 150

This is the book that served as the text for Solano College's biotechnology lecture course. The main useful chapters are Chapter 2 (The drug development process) and Chapter 3 (The drug-manufacturing process), which are excellent. It is weak on upstream processes like fermentation and cell culture. Chapter 2 and Chapter 3 combine for 82 pages, which is like a small book, but the rest of the book covers particular proteins and protein classes so it is less useful for a general course (although it makes a useful reference.) Between these two Chapters, the book covers the basics of cell culture, cell banks, protein recovery and purification, formulation, filling and lyophilization, clean rooms, QC analysis and the equipment that performs it, pyrogen detection, protein degradation pathways, regulation by the FDA and international regulatory agencies, good manufacturing practice, pharmacopoeias, and the cleaning and sterilization of equipment. It contains many photographs of large scale fermentation and recovery equipment. It begins with a discussion of the production of traditional pharmaceuticals and later includes protein pharmaceuticals; this provides an interesting contrast between Big Pharma and biotech companies.

Molecular Biotechnology - Second Edition
S. B. Primrose
Blackwell Scientific Publications - 1991
ISBN 0-632-03053 (for the paperback) - \$ 50

Molecular Biotechnology is written using clear language and written at the appropriate level, although parts of it will probably (appropriately) challenge lower division students. This book covers the history of the field well, covers recombinant DNA well, and has an excellent section on cell culture and fermentation, and on the production of monoclonal antibodies. It has major holes - especially in recovery and downstream processes - which it basically ignores. Jim tried to use this as a text in 1998, but the publisher couldn't supply it in sufficient numbers. It's beginning to be difficult to find.

Pharmaceutical Biotechnology
Daan J. A. J. Crommelin, Robert D. Sindelar,
Gordon and Breach Publishing - 1997 - \$ 65.00
ISBN: 9057022494

The authors wrote this excellent book to inform pharmacists and other members of that industry about the drugs that are produced by the biotechnology field. Solano College tried to use this as

their text during Fall semester 2002, but the publisher informed us that it had gone out of print. This book has Chapters on protein structure and general biochemistry, on fermentation and cell culture, on downstream protein purification processes, on formulation (a subject difficult to find materials), and on drug delivery and pharmacokinetics (again, these are areas where it is difficult to find references.) Its last Chapters cover specific pharmaceutical proteins like insulin, hematopoietic growth factors, deoxyribonuclease, tissue plasminogen activator, growth hormone, monoclonal antibodies, and vaccines. It also has a Chapter on professional education.

Proteins: Biochemistry and Biotechnology

Gary Walsh

J. Wiley - 2002

ISBN 0-471-89907-0

This new book covers basic protein structure, the production of proteins, protein purification, protein stability, and the production and biological action of specific protein classes.

Protein Biotechnology

Gary Walsh and Denis R. Headon

John Wiley & Sons - 1994, reprinted 1996

ISBN 0-471-94393-2 Cost \$ 70

Jim used this book in the past as the text for his biotech courses, and this is the book that Genentech used as the text for their in-house training course in 1996 and 1997. Sonia Wallman, who has an excellent biotech program at New Hampshire Technical College used this book also. This book is written at the appropriate level for freshman/sophomore/reentry students and it covers many issues in process science and manufacturing. It has an excellent discussion of recovery and downstream processes, but is weak on the upstream topics. It also has a European bias, that is, it emphasizes regulation of the industry by the European Union rather than by the FDA - this makes it less useful for an American program.

Pharmaceutical Biotechnology

Fundamentals and Essentials

Melvin E. Klegerman and Michael J. Groves

Interpharm Press - 1992

ISBN 0-935184-6 Cost \$ 107

This is an excellent reference book that emphasizes the topics important for manufacturing; it covers exactly the right topics. It is written for researchers in the field, so the level is inappropriately challenging for a lower division college student. The multiple authors means that it also suffers from an uneven writing style. Also, it's very expensive. Jim uses it extensively as a reference to prepare lectures.

Molecular Biotechnology - Second Edition

Principles and Applications of Recombinant DNA

Bernard R. Glick and Jack J. Pasternak

ASM Press - 1998 - \$ 50

ISBN 1-55581-136-1

This book is well written, but the level may prove challenging for lower division students. Their inclusion of the discussion of key historic papers from the scientific literature adds an interesting and important component. It has very good sections on fermentation and cell culture, a section on government regulation of the industry, and a section on patents. It does explore the business end of biotechnology some.

Biotechnology - A Textbook of Industrial Microbiology (Second Edition)
Wulf Crueger and Anneliese Crueger
Sinauer Associates, Inc. - 1989
ISBN 0-87893-131-7

Karen McDonald of UC Davis has used this book in the past as a text for her fermentation science course. Jim uses it as a reference. It is hard to find.

Protein Purification - Principles and Practice
Third Edition
Robert K. Scopes
Springer Verlag - 1994 - \$ 69.95
ISBN 0-387-9-4072-3

William Ward of Rutgers University who runs an excellent summer workshop on Green Fluorescent protein recommended this book; it is very good. Jim uses it as a reference for the theory behind protein separation techniques. It covers the principles behind protein precipitation, centrifugation, electrophoresis, and many types of chromatography. It has a section on scale up and a final chapter on the optimization of the process. It contains many useful graphs and diagrams.

THE BUSINESS SIDE OF BIOTECHNOLOGY

From Alchemy to IPO
Cynthia Robbins-Roth
Perseus Publishing - 2000 - \$ 26
0-7382-0253-3

This clearly written book focuses on the business side of biotechnology and it begins with the founding of Genentech and Amgen as case studies. The author was a research scientist at Genentech in the early days and explains in detail how Bob Swanson and Herb Boyer began their company and kept it afloat during its early vulnerable years. Dr. Robbins-Roth left the lab bench to become a biotech business writer and consultant, and she brings her science background to analysis of business trends. Her website is www.bioventureconsultants.com Jim uses this as the text to accompany his business class.

Biotechnology - The Science and the Business - Second Edition
Derek G. Springham, Ronald Cape, and Vivian Moses (Editors)
Gordon and Breach Publishing - 1999

ISBN 9057024063 (Hard Cover) Cost \$ 150
ISBN 9057024071 (Soft Cover) Cost \$ 56

This book does exactly what a book for a comprehensive course should do: it integrates a discussion of the science behind biotech with the business end and the regulatory end. It suffers from the blessing and curse of different authors writing every chapter: they know their subject but the writing style is very uneven. Another blessing and curse, it covers the broadest possible components of the field and includes alcohol production, flavor ingredients, pesticides, and oil production. Ronald Cape, one of the founders of Cetus, served as one of the editors for the first edition and this new edition still makes many references to long-dead Cetus. The regulatory discussions, although they do cover oversight by the FDA and U.S. Patent law, often show a European bias. Last, it's expensive; the hardback costs \$ 150 although the paperback can be purchased for \$ 56.

Exploiting Biotechnology
Sheila Moses and Vivian Moses
Hardwood Academic Publishers - 1995
ISBN 3-7186-5570-5 (hardcover) - \$ 64
ISBN 3-7186-5571-3 (softcover) - \$ 28

One of the authors of the above book wrote this book. It is not as comprehensive as the "Biotechnology - The Science and the Business" book above, but it has several interesting chapters on intellectual property (Chapter 5), management (Chapter 6), and changes in healthcare (Chapter 7). Jim found it in one library, but had trouble finding himself a copy.

First Fruit: The Creation of the Flavr Savr Tomato and the Birth of Biotech Food
Belinda Martineau
McGraw-Hill - 2001 - \$ 24.95
ISBN 0-07-136056-5

The author is a former Calgene scientist who tells the inside story of the Flavr Savr tomato, the first Genetically Modified food to go to market. After their release, these tomatoes enjoyed a brief period of glory, and then suffered a spectacular decline and ultimate failure. It is a very interesting story of good science and bad business.

Evolutionary Innovations: The Business of Biotechnology
Maureen McKelvey
Oxford University Press - 2000 - \$ 29.95
ISBN 0198297246

The Golden Helix
Arthur Kornberg
University Science Books - 1995 - \$ 29.95
ISBN 0935702326

The Biotech Investor's Bible

George Wolff
John Wiley and Sons - 2001 - \$ 29.95
ISBN 0471412791

This book explains the business side of biotechnology to investors, and contains a very good assessment of individual biotechnology companies. Specifically, it ranks biotech companies into “tiers” according to their maturity and potential, with “Tier 1” being the very few biotech companies that are actually breaking even. It’s good to get a feel for the way that investors view the industry.

BOOKS FOR A GENERAL AUDIENCE OR AN INTRODUCTORY COURSE

DNA - The Secret of Life
James D. Watson with Andrew Berry
Alfred A. Knopf - 2003 - \$ 30
ISBN 0-375-41546-7

This excellent new book by Watson has been written for a popular audience and contains the scientific basis and the history of the discovery of the central dogma, recombinant DNA, and of the genomics revolution. It’s typical Watson: opinionated, a bit brash, but well written. The photographs are excellent and give it the feel of a coffee table book.

Biotechnology - Third Edition
John E. Smith
Cambridge University Press - 1997 - \$ 20
ISBN 052144911-1

This is an excellent introductory book for a popular audience. It’s clearly written (at the college freshman level), provides good (and broad) background in the field, and it does cover process technologies. We couldn’t find any substantial inaccuracies. It has introductory chapters on intellectual property, safety, and bioethics. It is probably not appropriate as a text because it does not cover the subjects in enough depth. Also, it does have a British bias. Give this to a student who is just beginning, or to a friend who asks you what you do .

Molecular Biology Made Simple and Fun - Second Edition
Lonnie Russell and David Clark
Cache River Press - 2000
ISBN 0-9627422-9-5 - \$ 34.95

This is a remarkable book that tackles advanced subjects with cartoons and humor. Some high school teachers that I know have tried to use it, but they report that it is a bit advanced for this application. It has humorous diagrams (cheerleaders with card-section signs saying, “give me an A..give me a T” for example), but the format is deceptive since the subject matter is advance; Jim refers to this book quite a bit in preparations of lectures. At the end of the book, it has an amusing appendix that has a “typical seminar” with the technical terms on one side and a running commentary that translates it into English in a neighboring column.

The Cartoon Guide to Genetics - updated edition
Larry Gonick and Mark Wheelis
Harper Perennial - 199
ISBN 0-06-273099-1 Cost \$ 15

This is a fun book that can be read by someone not familiar with the field, although the science is superb. Mark Wheelis teaches microbiology at UC Davis where he is considered one of the best teachers on campus. Highly recommended.

Biotechnology: Demystifying the Concepts
David Bourgaize, Thomas Jewell, Rodolfo Buiser
Benjamin Cummings Press - 1999 - \$ 74
ISBN 0-8053-4602-3

This is an interesting book that seems to be written for a freshman level student without any background in biology. It teaches basic biology by using a biotech emphasis. It covers mitosis and meiosis, Mendelian genetics, and central dogma, then gives the applications to biotechnology. It does include a section on business issues in biotechnology and a very interesting section on eugenics. This might be appropriate for a non-majors course in Introduction to Biotechnology that some colleges have included as sort of an orientation course and a recruiting device. It probably doesn't go into enough detail in the subjects to be used for a capstone course.

Biotechnology - Present Position and Future Developments
Martina Newell McGloughlin and James I. Burke
Teagasc Press - 2000
ISBN 1-84170-122-X

This book by UC Davis and the University of California systemwide Biotechnology program director Martina McGloughlin serves as an important source, especially for the application of biotechnology to agriculture.

Genome: The Autobiography of a Species in 23 Chapters
Matt Ridley
Harper Collins - 2000 - \$ 26
ISBN 0-06-019497-9

Read this book immediately. This is a popular book written for a popular audience, but unless human genetics or genomics is your specialty, you will probably learn something in every chapter. The writing style is straight forward and engaging, and should be accessible to anyone. The author weaves a whole biology course into a discussion of chromosomes. Jim likes to give this book as a gift.

Abraham Lincoln's DNA and other Adventures in Genetics

Philip Reilly
Cold Spring Harbor Laboratory Press - 1999
ISBN 0-87969-580-3 - \$ 25

Keith Conover of Glendale College recommended this book. It uses case studies and profiles of particular researchers to tell stories about fascinating case studies where genetics (and the new genetics) plays a role. The author was a lawyer interested in genetics who then completed Medical School. He served on the panel that developed the recommendation for the title case: "should some of the remains of Abraham Lincoln be used to determine whether this revered figure in American history had Marfan's syndrome?" (Their answer was 'not yet, at least.')

The book also examines the identification of the remains of the Romanovs, hemophilia in the Royal families of Europe, the genetics of Toulouse-Lautrec's short stature and genius. This book does not shy from controversy; it discusses the possible genetic components of mental illness, homosexuality, and violent behavior. Later chapters cover issues in bioethics that include cloning, frozen embryos, the debate over GMOs, xenotransplantation, and privacy issues in genetic testing. In each case the author gives specific case studies or discusses the efforts of the key researchers in the field. Jim uses stories from this book to spice up lectures in Genetics.

Understanding Biotechnology
Aluizio Borem, Fabricio Santos, David Bowen
Prentice Hall - 2002 - \$ 34.99
ISBN 0-13-101011-5

This is a quirky book. One interesting topic that sets it apart is its coverage of the intersection between biotechnology and religion.

Biotechnology - A Scientific Reference Guide for Everyone
Wendell Zehel
SterlingHouse Publisher - 2000 - \$ 17.95
ISBN 1-56315-131-6

CLASSIC MOLECULAR BIOLOGY BOOKS

Recombinant DNA - Second Edition
J.D. Watson, Michael Gilman, Jan Witkowski, and Mark Zoller
Freeman - 1992 - \$ 58
ISBN 0716722828

This standard is still an excellent book with that wonderful Scientific American art. It's very strong on recombinant DNA (although lower division students have trouble with the level) and on the research end of biotech. Its poor coverage of cell culture and recovery make it level useful to a class that trains technicians. I have heard that a new edition is due out in 2002.

Molecular Cell Biology - 4th Edition
Harvey Lodish, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, and

James Darnell
W. H. Freeman - 1995
ISBN 071673706X - \$ 75.95

This is the textbook that Philip Jardim of City College of San Francisco settled upon as a textbook for his biotechnology class. It has excellent science and excellent art.

EXPRESSION

Gene Expression Systems: Using Nature for the Art of Expression
Joseph M. Fernandez and James P. Hoeffler (Editors)
Academic Press - 1999 - \$ 65
ISBN 0-12-253840-4

This excellent book covers different elements of expression like host cells, promoters, and regulatory sequences. It gives advantages and disadvantages for the use of *E. coli*, *Bacillus*, *Saccharomyces*, *Pichia pastoris* and *Pichia methanolica*, mammalian cells, and plants.

HUMAN GENETICS

The Human Genome: A User's Guide
R. Scott Hawley and Catherine A. Mori
Academic Press - 1999
ISBN 0-12-333460-8

This well written book by UC Davis Professor Scott Hawley and a former student clearly explains human genetics and discusses many human genetic diseases. Hawley doesn't shy away from controversy - for example, he discusses the evidence for the genetic basis of homosexuality.

An Introduction to Human Molecular Genetics: Mechanisms of Inherited Diseases
Jack J. Pasternak
Fitzgerald Science Press - 1999 - \$ 59.95
ISBN 1-891786-03-2

This excellent up-to-date book discusses the basics of mapping and finding and sequencing the gene that's responsible for a human genetic disorder. It focuses in on the specifics of the molecular genetics of cancer, muscle disorders, neurological disorders, and of mitochondrial disorders. I was disappointed that it didn't include more on blood disorders, though. I use this as a reference when I hear of a genetic disorder and I want a detailed description.

CELL CULTURE

Animal Cell Culture and Technology
Michael J. Butler
Oxford University Press - 1998 - \$ 25
ISBN 0199634165

This is the reference that cell culture specialists seem to like.

Tissue Culture Techniques
Bernice Martin
Springer-Verlag - 1994 - \$ 99
ISBN 0-8176-3643-9

Sandy Porter (formerly from Seattle Central College) suggested this book to train technicians. She says that it has realistic problems, and does a great job of covering important topics like using a hemocytometer to count cells, when to call the vendor, etc.

ENGINEERING BOOKS - As it turns out, the biotechnology is much more chemical engineering than molecular biology.

Bioprocess Engineering : Basic Concepts
by Michael L. Shuler, Fikret Kargi
Prentice Hall - 1991 - \$ 89
ISBN: 0134782151

This is an interesting book since it views biotechnology (and biology/microbiology) through the eyes of a chemical engineer. It has an excellent section on the history of the field. It also had several dense and thorough chapters on biology to bring engineers up to speed. I use this as a reference quite a bit. It is written for engineers at the senior or graduate level.

Bioprocess Engineering - Systems, Equipment, and Facilities
Lydersen, D'Elia, and Nelson
John Wiley and Sons - 1994 - \$ 95
ISBN 0-471-03544-0

This book was written primarily by engineering and equipment contractors, along with operations folks in industry. It is targeted specifically to train folk new to manufacturing operations. It has discussions that are very practical; not highly scientific in nature or style, with oversimplifications and/or inaccuracies here and there. It has good chapters on fermenter design (ch 1), tangential flow filtration (ch 3), chromatography operations (ch 5), piping (ch 7), pumps (ch 8), cartridge filtration (ch 9), instrumentation and control (ch 11), cleaning (ch 12), sterilization (ch 13), water (ch 14), utilities (ch 15), HVAC (ch 17), facility design (ch 18), and validation (ch 21).

Bioreactor System Design
Asenjo and Merchuk
Marcel Dekker Inc - 1995 - \$ 195
ISBN 0-8247-9002-2

This is another engineering book with a strength in bioreactor/fermenter design.

Principles of Fermentation Technology - Second Edition
P. F. Stanbury, A. Whitaker, and S. J. Hall
Elsevier Science - 1998 - \$ 74.99
ISBN 0-08-036131-5

This emphasizes the structure and function of a bioreactor. It also has a chapter on fermentation economics.

REGULATION

Protecting America's Health - The FDA, Business, and One Hundred Years of Regulation
Philip J. Hilts
Alfred A. Knopf - 2003
ISBN 0-375-40466-X

This popular book gives the history of the Food and Drug Administration and of the consumer legislation that led to the regulation of food and pharmaceutical quality. It begins with the era of the Robber Barons where companies marketed patent medicines, snake oil, and adulterated food without government interference. It examines the impact of the Progressive movement as creating the initial push for government oversight and takes us to the current era where there is still a tension between business (especially nutrient supplements) and government.

Documentation Basics That Support Good Manufacturing Practices
Carol Desain
Advenstar Communications - 2001
ISBN 092987062X

Ron Midgett, the Director of Training of Lonza Pharmaceuticals who works with Sonia Wallman suggested this book.

Good Manufacturing Practices for Pharmaceuticals
A Plan for Total Quality Control Fourth Edition
Willig and Stokes
Dekker Inc - 1997 -\$ 100
ISBN 0-8247-9770-1

Regulatory Practices for Biopharmaceutical Production
Susan Vargo and Anthony Lubiniecki
John Wiley - 1994 - \$ 149.95
ISBN 047104900X

BioGMP training software from SPI - \$ 1500
Online demo www.spi.pt/biogmp

This excellent software covers topics in Good Manufacturing Practices and offers a quiz at the end of each unit. The author Antonio Moreira is a chemical engineer from the University of

Maryland. The \$ 1,500 price is obviously for industry and not academics, but he offers a two-day seminar twice a year for \$ 1,750 that includes the software in the price of the course.

Crab Wars: A Tale of Horseshoe Crabs, Bioterrorism, and Human Health

William Sargent

University Press of New England - 2002 - \$ 24.95

ISBN 1584651687

Sargent is a wildlife biologist who has been fascinated by horseshoe crabs his entire life. This personal tale weaves the biology and wildlife management of these creatures into the story of how a few Woods Hole biologists discovered that a lysate of their amoebocyte cells could generate an assay for endotoxin; this assay was so sensitive that it became the industry standard and spawned an industry to supply it. Sargent raises worries about the health of the *Limulus* population and argues that the importance of *Limulus* lysate can be used as an argument to maintain healthy stocks for a sustainable harvest.

FORMULATION

Pharmaceutical Biotechnology

Daan J. A. J. Crommelin, Robert D. Sindelar,

Gordon and Breach Publishing - 1997 - \$ 65.00

ISBN: 9057022494

This book has (that I listed before) has a key Chapter on formulation written for pharmacists (who must cope with formulation issues on a daily basis).

Therapeutic Peptides and Proteins: Formulation, Processing, and Delivery Systems

A.K. Banga

Technomic Publishing Co - 1995 - \$ 95

ISBN 1-56676-329-0

This is another advanced text written for the upper division level, but it could be given to lower division students with extensive coaching. It compiles the relevant information in the difficult field of formulation at very rapid pace without a lot of background information.

I use this as a reference for lectures on protein stability, protein formulation, and pharmacokinetics. It has some discussion of drug delivery.

Polypeptide and Protein Drugs

R. C. Hider and D. Barlow

Ellis Horwood Press - 1991

ISBN 0-13-677253-6

The folks at Genentech recommended this book and I use this as a reference. It has chapters on HPLC, freeze-drying, toxicity and safety testing, pyrogen testing, and it has a series of case studies that are interesting. I worry about the 1991 date.

LABORATORY BOOKS FOR TEACHING LABS

Biotechnology: A Laboratory Manual in Molecular Biology
Teresa Thiel, Shirley Bissen, Eilene Lyons
McGraw Hill 2001 - \$ 65
ISBN 0-07-241664

This book serves as the lab manual for one of the Solano College laboratory courses that Jim teaches. It uses a semester long project where students manipulate genes for amylase and work with this important and interesting enzyme. It also integrates excellent exercises in bioinformatics and 3 D computer modeling of protein and DNA with the web lab procedures. But, there are a few things that really offend me. First, \$ 65 for a very thin spiral bound book seems outrageously expensive. Also, until recently the bacterial strains weren't available through a third party vendor; they had to be ordered from ATCC; the publisher told me that this has been changed. Also, each experiment uses very expensive reagents. If you need the bacterial strains, contact Jim and he'll mail them to you.

Biotechnology Explorations
Applying the Fundamentals
Judith A. Scheppler, Patricia E. Cassin, Rosa M. Gambier
ASM Press - 2000 - \$ 49.95
ISBN 1-55581-178-7

Wendie Johnston of Pasadena City College and Jim both really like the experiments in this book. It has an excellent upfront explanation of keeping labbooks and making solutions. It starts with basic experiments in microbial cell culture and DNA isolation. It has students work with green fluorescent protein and it has an interesting experiment where students probe 16S RNA genes from a variety of organisms representing 5 Kingdoms (if you still adhere to the 5 Kingdom classification scheme.) It has the list of vendors that can supply the appropriate microbial strains, vectors, and primers, but only the primary source (like the ATCC) is given for obtaining the 10 organisms. Since each costs over \$ 145, I worry that most of the experiments would exceed the budget of most schools. Again, if you need any of the bacterial strains, contact Jim.

Unraveling DNA: Molecular Biology for the Laboratory
Michael R. Winfrey, Marc A. Rott, and Alan T. Wortman
Prentice Hall - 1997 - \$ 54
ISBN 0132700344

This is the book that Philip Jardim of City College of San Francisco uses; he worked with the authors at the University of Wisconsin-La Crosse. It has very interesting experiments where the lux operon of *Vibrio fischeri* is cloned into an expression plasmid that's used to transform *E. coli* to make it bioluminescent. Recently, Fotodyne has contracted to carry the plasmids and the bacterial strains: www.fotodyne.com. I was surprised at how dim the glowing bacteria can be - it has to be really dark for you to see the bioluminescence of the *E. coli* transformed with the lux gene.

Basic Laboratory Methods for Biotechnology
Textbook and Laboratory Reference

Lisa Seidman, Cynthia Moore
Prentice Hall - 1999 - \$ 66.75
ISBN 0137955359

This excellent lab book emphasizes calculations that students can practice and covers all elements of the laboratory experience like safety, making solutions, volume, mass, pH, and temperature measurement, and the operation of many common laboratory instruments. It also instructs students on how to keep a notebook, and how to collect and analyze data. There are sections that are appropriate for a manufacturing curriculum that discuss GMP and ISO 9000. If a student could master this book, they should be hired immediately.

Laboratory DNA Science
Bloom, Freyer, and Micklos
Benjamin Cummings - 1995 - \$ 33
ISBN 0-8053-3040-2

Excellent experiments developed by the team at Cold Spring Harbor Laboratory. Every student should perform the two PCR experiments that use tPA-25 Alu sequences and DS180 VNTR detection. (Cold Spring Harbor Laboratories currently recommend an experiment that looks at Alu in a different region of the genome, since the Alu in tPA-25 has been found to be associated with one form of heart disease. Of course, Cold Spring Harbor Labs supports and continues to develop new exercises. This has a new edition due to be released in June 2002 by Cold Spring Harbor Press.

DNA Science: A First Course in Recombinant DNA, Second Edition
David Micklos and Greg Freyer
Cold Spring Harbor Press - 2002 - \$ 39.95
ISBN 0-87969-636-2

This new edition will incorporate the changes that the team has made; the website indicates that “the first eight chapters have been completely revised, extensively rewritten, and updated.” This edition will include the new experiments developed at Cold Spring Harbor’s Dolan DNA Learning Center; presumably this includes the experiment where students cycle sequence a section of their mitochondrial DNA. Carolina Biological will carry the appropriate kits, primers, and strains.

Biotechnology - A Laboratory Course Third Edition
Becker, Caldwell, and Zachgo
Academic Press - 1996 - \$ 30
ISBN 0-12-0845628

This book has some excellent experiments. I especially like its treatment of routine laboratory procedures, like making up phosphate buffers. It has an excellent series of experiments that have the students generate, purify, and assay \exists galactosidase.

Fundamental Laboratory Approaches for Biotechnology

Alexander Ninfa, David Ballou
Fitzgerald Science - 1998 - \$ 44.95
ISBN 1891786008

This book begins with protein purification and follows later with experiments in DNA. It has some excellent sections on protein purification and detection which include discussions of buffers, chromatography, electrophoresis, enzyme kinetics, and spectrophotometry. In several experiments, it uses *E. coli* Alkaline Phosphatase as the model protein to purify and assay.

Short Protocols in Molecular Biology - Fourth Edition
Edited by Frederick M. Ausubel, Roger Brent, Robert E. Kingston, David D. Moore, J.G. Seidman, John A. Smith, Kevin Struhl
J. Wiley Press - 1999 - \$ 120
ISBN 04732938X

I refer to this book often as a reference (rather than the larger Maniatis et al.) Wendie Johnston at Pasadena City College has her students reference this book to give them independence after they graduate. The major drawback is the cost: the fourth edition's price jumped from \$ 80 to \$ 120.

At the Bench - A Laboratory Navigator
Kathy Barker
Cold Spring Harbor Laboratory Press - 1998 - \$ 47
ISBN 0-87969-523-4

This excellent book should be given by P.I.'s to their new graduate students or should be purchased by new graduates beginning an R and D career. It helps to orient the new researcher to what is not important in the lab (there is no dress code) and what is (attend every lab meeting and keep your lab notebook up to date). It contains tips on how to organize your lab bench ("its setup and maintenance are integral to the reproducibility of your experiments) and how to design an experiment. It also has some nuts and bolts instruction on how to make buffers, maintain bacteria stocks and cell lines, and how to dispose of wastes.

At the Helm - A Laboratory Navigator
Kathy Barker
Cold Spring Harbor Laboratory Press - 2001 - \$ 55
ISBN 0-87969-5838

This book addresses the key flaw of the American Research University system: lab directors are trained at the lab bench and to critically review the scientific literature, but not trained to do what they end up doing - running a lab and managing personnel. This book addresses the key challenges in running a lab.

Lab Ref: A Handbook of Recipes, Reagents, and Other Reference Tools for Use at the Bench
Jane Roskams and Linda Rodgers Eds.
Cold Spring Harbor Press - Due July 2002 - \$ 24,95

ISBN 0-87969-630-3

This small book is much less useful than the other Cold Spring Harbor laboratory manuals.

Plant Tissue Culture Studies

Smith

National Association of Biology Teachers - 1997

ISBN 0-941212-24-6

I haven't performed any of these experiments, but they seem excellent.

BIOINFORMATICS AND GENOME PROJECTS

Developing Bioinformatics Computer Skills

Cynthia Gibas and Per Jambeck

O'Reilly and Associates - 2001 - \$ 34.95

ISBN 1-56592-664-1

This is the bioinformatics book that Jim likes. It discusses databases and search engines and it includes a primer on the operating systems and languages that someone in bioinformatics should at least develop a rudimentary knowledge in: Unix and Linux (for those of us who converted to Windows or Mac and didn't look back) and Perl. The book includes specifics on the major current biological databases and common sequence search techniques, and it also covers a bit of proteomics and microassays. Jim is considering this as a text to accompany a bioinformatics course.

Beginning PERL for Bioinformatics

James D. Tisdall and Betsy Waliszewski

O'Reilly and Associates - 2001 - \$ 39.95

ISBN 0596000804

The author wrote this book for biologists to get started programming for the field of bioinformatics. It is written as a tutorial. Biologists should also learn HTML, Linux (or Unix), a database like Access, and PERL for a programming language. This book covers PERL and uses problems and exercises that focus on biological problems to teach the language.

As the Future Catches You: How Genomics and Other Forces are Changing your Life, Work, Health, and Wealth

Juan Enriquez

Crown Business

ISBN 0-609-60903-3

This is a quirky book suggested by UC Davis' Stephanie Tatum Murphy. It covers interesting topics and is worthwhile to see just for its interesting approach: it mixes sizes and typefaces to emphasize or de-emphasize points.

OTHER USEFUL REFERENCES

Pharmaceutical Microbiology - Sixth Edition
W. B. Hugo and A. D. Russell
Blackwell Science - 1998
ISBN 0-632-04196-X (paper) \$ 104.95

This has an excellent chapter on the production of penicillin that I use to begin all of my biotechnology courses. The penicillin story demonstrates the how the interesting interplay between many disciplines within science and government and business came together to produce one of the most significant achievements in human history. This same science/ government/ business interaction has been repeated with most drugs produced by biotech companies.

The New Genetics CD ROM
www.twistedladdermedia.com - \$ 59.95

Dr. Sally Tobin has put together an excellent CD-ROM tutorial on genetics and the human genome project. Highly recommended.

Biotechnology from A to Z Second Edition
W. Bains
Oxford University Press - 1998 - \$ 28
ISBN 0-19-963334-7

This book is an extended glossary of biotechnology terms. It is an excellent, helpful, quick, and easy reference. It has a forward by G. Kirk Raab, the former CEO of Genentech. It would make a good reference for students to use.

Biotechnology Unzipped
Promises and Realities
Eric Grace
Joseph Henry Press - 1997
ISBN 0-309-05777-9 - \$ 18.95

This is similar in level and style to Biotechnology from A to Z above. It is written for a very general audience and might be appropriate for high school students.

Unraveling DNA - The Most Important Molecular of Life
Maxim D. Frank-Kamenetskii
Addison-Wesley - \$ 15.00
ISBN

This is an interesting book by a structural biochemist who specializes in DNA topology, supercoiling, and unusual structures. One question that it asks is "Is DNA really a double helix?" The Watson and Crick B form structure was based on X ray diffraction studies of DNA fibers, but does DNA have this form in solution or in the cell? (As it turns out, it does, but this

wasn't known until the 1990's.)

Microbiology An Introduction
Tortora, Funke, and Case - 8th Edition
Benjamin Cummings - 2003 - \$ 75
ISBN 0-8053-7613-5

A classic - the best selling micro book in history. When we introduced this book to Genentech folks, they couldn't believe how well written it is.

Microbiology: Principles and Explorations - Fifth Edition
Jacquelyn G. Black
J. Wiley Press - 2002
ISBN 0-471-38729-0

Jim has screened many, many microbiology books. This is the other one that is written for lower division courses that he likes.

Brock Biology of Microorganisms - Tenth Edition
Michael Madigan, John Martinko, Jack Parker
Prentice Hall - 2003
ISBN 0-13-066271-2

HISTORY OF THE FIELD

The Double Helix
James D. Watson
Simon & Schuster Trade - 1998 (1968)
ISBN: 0684852799 - \$ 25
NAL/Dutton - May 1976
ISBN: 0451627873 - \$ 6.99

This classic biography reads like a detective novel and like a gossip column. When it was first published in 1968, it was considered scandalous (and consequently rocketed to the top of the best seller's lists). In the book Watson seems to spend an equal amount of time trying to find a girlfriend and trying to make the biggest scientific discovery of the twentieth century. Watson wrote so frankly that some of his colleagues didn't speak to him for years. (His running title of the book had been "Honest Jim,").

Genes, Girls, and Gamow - After the Double Helix
James D. Watson
Alfred A. Knopf - 2001 -
ISBN 0-375-41283-2

This new book picks up where the double helix left off and is written in the same frank and gossipy tone. After discovering the double helix, Watson moves back to the US to do work at Cal Tech (he trashes California) and Woods Hole. Along the way he continues his effort that he

described in “The Double Helix” to find a girl friend, aided by other young scientists who later become the scientific elite of the United States and Great Britain. He describes the early days of the RNA Tie Club and the efforts involved to work out expression (including the speculation about and ultimate discovery of the roles of mRNA and tRNA.) It’s an interesting read.

What Mad Pursuit

F. H. C. Crick

Basic Books Inc - 1988

ISBN: 0-465-09138-5

Crick’s book was written many years after the discovery of DNA. Although it’s an interesting book to read, and an important book, it’s now out of print and hard to find. I guess that the fact that it wasn’t as sensational and gossipy as “The Double Helix” hurt sales.

Watson and DNA: The Making of a Scientific Revolution

Victor McElheny

Perseus Publishing - 2003 - \$ 27.50

ISBN 0738203416

An interesting biography that fills in some of the gaps of the other biographies. It’s especially interesting to read about Watson’s Harvard days where his colleague E. O. Wilson called him “the Caligula of biology.”

Rosalind Franklin and DNA

Anne Sayre

Norton - 1990 - \$ 10.95

ISBN 0393008681

Rosalind Franklin died of cancer in 1958 and couldn’t tell her story. Biographer Sayre, who knew Franklin, wrote this book to counter Watson’s description of “Rosy” that he gives in his book “The Double Helix.” Sayre gives voice to this important part of the story. But this biography has been criticized for going the other way; for lionizing Franklin with an obvious feminist bias without critically evaluating any of her faults.

Rosalind Franklin - The Dark Lady of DNA

Brenda Maddox

Harper Collins - 2002 - \$ 29.95

ISBN 0060184078

Rosalind Franklin

Cath Senker

Raintree Publishers - 2001 - \$ 27.12

ISBN 0739852264

The two books above are new biographies of Rosalind Franklin in the same tradition as the Sayre book. They are sympathetic and draw from her personal correspondence and from interviews

with living scientists including Watson and Crick. But, they also don't pull punches on her faults and attitudes (including calling things "so middle class" to belittle them) and on her inability to get along with others besides Watson and Wilkins.

Acid Tongues and Tranquil Dreams - Tales of Bitter Rivalry that Fueled the Advancement of Science and Technology

Michael White

Morrow - 2001 - \$ 26

ISBN 0380977540

As one of its eight rivalries, this has a section on Watson and Crick versus Linus Pauling versus Franklin and Wilkins. (The others include Newton versus Leibniz for the discovery of calculus, the U.S. versus the USSR racing to the moon, the Allies versus the Axis racing to develop the atom bomb.)

A Passion for DNA: Genes, Genomes, and Society

James D. Watson

Cold Spring Harbor Laboratory Press - 2001

ISBN 0-87969-581-1

In this collection of essays collected by Cold Spring Harbor Press, their Director then President Jim Watson writes about the human genome project, the war on cancer, his early defense of the safety of recombinant DNA, and other topics in bioethics. On the jacket cover, Richard Dawkins writes "Jim Watson has elevated his unique combination of justified arrogance, scurrilous candor, and disconcertingly mature wisdom into an art form."

James Watson and Francis Crick: Discovery of the Double Helix and Beyond (Makers of Modern Science)

David Newton

1992 - \$ 19.95

ISBN 0816025584

DNA Pioneers and their Legacy

Ulf Lagerkvist

Yale University Press - 1998

ISBN 9-780300-071849

This charming book covers the history of biochemistry and molecular biology. Lagerkvist begins with the earliest alchemists' view of science and moves to the present. He includes a scientific biography of the pioneers of organic and biochemistry including the discovery of DNA by Frederich Miescher, and the contributions of Emil Fischer and other early giants.

The Eighth Day of Creation

Horace Freeland Judson

Cold Spring Harbor Press (Reissued 1996)

ISBN 087969477 (Hardcover) - \$ 55

ISBN 0879694785 (Paperback) - \$ 46.25

This is an excellent book that tells the story of the early days of molecular biology. It gives the story of the discovery of the structure of DNA as a play in several acts. But where “The Double Helix” leaves off, this book picks up; it describes the discovery of messenger RNA and of the Genetic Code by recounting the stories of the people involved. It was first printed in 1979, but Cold Spring Harbor Press reissued it in 1996.

Invisible Frontiers: The Race to Synthesize a Human Gene

Stephen S. Hall

Oxford University Press - 2002 - \$ 15.95

ISBN 0195151593

This well written 1987 book went out of print and but thankfully has been rereleased (in paperback) by Oxford University Press. It tells the early days of the commercialization of recombinant DNA and Genentech and of the effort to produce (and eventually market) human insulin. It has the same feeling of scientists racing against each other that dominates The Double Helix. But in this case, the race is for the patent on human insulin and billions of dollars are at stake. The rallying cry of the book and of the competitive industry is “Clone or Die.”

Making PCR: A Story of Biotechnology

Paul Rabinow

University of Chicago Press - 1996 - \$ 22.50

ISBN 0-226-70146-8

Rabinow is an anthropologist at UC Berkeley who looks at the people in biotech from the point of view of an anthropologist looking at a different culture. In this book he turns his attention to PCR. For many people, the discovery of polymerase chain reaction begins and ends with Kary Mullis’ brainstorm while driving along a winding road on the way to Mendocino. This story fills in the blanks about the team effort at Cetus to bring this technology to market and into virtually every laboratory. He covers the history of Cetus, from its origin as the first biotech company to its decline and acquisition by Chiron. Rabinow has also recently written a book that examines the culture of biotechnology in France called “French DNA.”

HER2: The Making of Herceptin, a Revolutionary Treatment for Breast Cancer

Robert Bazell

Random House - 1998

ISBN: 0-679-45702-X

This book recounts the history of discovery of the Her 2 receptor and of the effort, mainly by Dennis Slamon of UCLA, to develop a monoclonal antibody as a therapeutic drug to treat the cases of breast cancer that overexpress this antigen. The publisher times the release of this book with the announcement of Herceptin’s FDA approval. Herceptin will be the first drug produced at Genentech’s Vacaville manufacturing facility.

The Gene Masters: How a New Breed of Scientific Entrepreneurs Raced for the Biggest Prize in

Biology
Ingrid Wickelgren
Times Books - 2002 -
ISBN 0-8050-7174-1

This is one of many books that are now telling the story of the colorful characters of the Human Genome Project.

The Emergence of Bacterial Genetics
Thomas Brock
Cold Spring Harbor Press - 1990
ISBN 0-87969-350-9

The Early Days of Yeast Genetics
Michael Hall and Patrick Linder
Cold Spring Harbor Press - 1993
ISBN 0-87969-378-9

These books examine the history of bacterial and yeast genetics and looks at their importance in triggering the beginning of the field of molecular genetics.

For the Love of Enzymes: Odyssey of a Biochemist
Arthur Kornberg
Harvard University Press - 1989
ISBN 0-674-30776-3

Nobel Laureate Arthur Kornberg uses this autobiography to describe his spectacular career including the discovery of DNA polymerase I and his pioneering work on DNA replication. He connects his experience with the earlier scientists in the field.

IMMUNOLOGY

Fundamental Immunology
William Paul
Lippincott - Raven - 1998 - \$ 135
ISBN: 0781714125

This seems to be THE immunology book. It's very good on the experimental background on the field.

FORENSIC DNA ANALYSIS

Keith Inman and Norah Rudin
An Introduction to Forensic DNA Analysis
CRC Press 1997

This excellent book gives a primer, and then supplies details, on the techniques that are used in “DNA fingerprinting.” Inman works at the California Department of Justice Laboratory that is cataloging the DNA fingerprints of every inmate in prison in the State of California. This has interesting inserts with real cases, including a dot blot of the O.J. case.

DNA Technology in Forensic Science
National Research Council
National Academy Press 1992

The Evaluation of Forensic DNA Evidence
National Research Council
National Academy Press 1996

The first report was the initial effort by the National Academy of Sciences to address the reliability of DNA evidence. That report began the impression that DNA evidence was “bulletproof.” This report later came under a barrage of criticism that triggered the second report.

Edward Connors, Thomas Lundregan, Neal Miller, and Tom McEwen
Convicted by Juries, Exonerated by Science: case Studies in the Use of DNA Evidence to
Establish Innocence After Trial
U.S. Department of Justice, National Institute of Justice 1996

This has a list of cases of people who were wrongly accused of crimes and convicted (usually by eye-witnesses who seemed to the juries to be reliable) and subsequently released after DNA evidence proved that they were not the perpetrator.

Barry Scheck, Peter Neufeld, and Jim Dwyer
Actual Innocence: Five Days to Execution, and other dispatches from the Wrongly Convicted
Doubleday 2000 - \$ 24.95
ISBN 0-385-49341-X

Scheck and Neufeld run “The Innocence Project” that reopens old cases of prisoners and applies DNA evidence to prove innocence. Barry Scheck won the O.J. case by dismantling virtually every piece of physical evidence. Jim Dwyer is an author that has followed the progress of the innocence cases for a long time.

Colin Evans
The Casebook of Forensic Detection
John Wiley and Sons - 1996
0-471-28369-X

These cases cover forensic evidence of all types, but include several key cases where DNA evidence was first used to secure a conviction.

William Maples and Michael Browning

Dead Men Do Tell Tales: The Strange and Fascinating Cases of a Forensic Anthropologist
Doubleday - 1994

This is an interesting book by the forensic anthropologist who worked on several historical mysteries including the death of the Romanovs.

Gerald Sheindlin and Catherine Whitney
Blood Trail: True Crime Mysteries Solved by DNA Detectives
Ballantine Books - 1996

Sheindlin was the judge in the Castro case, a key case where DNA evidence played a key role for the first time. In that case, Barry Scheck defended the accused, and dismantled the prosecutions' DNA evidence.

Jeffrey Toobin
The Run of His Life - The People v. O. J. Simpson
Touchstone Books 1997
0-684-84278-5

The definitive O.J. book by an excellent journalist who also has a law degree. The key part of interest to biotechnologists describes how lawyer Barry Scheck won the trial for O.J. by destroying the prosecution's case by attacking the way that each piece of evidence had been collected. This book serves as the basis of the 2016 miniseries on FX.

Joseph Wambaugh
The Blooding
Bantam 1989
ISBN 0-553-28281-6

Wambaugh, the author of "The Onion Field" and other police true life or fictional accounts, wrote this work about the murders in the English Midlands where the first application of DNA fingerprinting techniques flushed out the murderer and led to the solution of the crimes.

GREEN FLUORESCENT PROTEIN

Here are the references on Jim's favorite protein:

Green Fluorescent Protein: Properties, Applications, and Protocols
Martin Chalfie and Steven Kain
Wiley-Liss - 1996 - \$ 65
ISBN 0-471-17839-X

This book is the most useful general reference on GFP. It contains the history of the discovery of GFPs, the current understanding of the structure of the protein and of the structure of the fluorophore, and it contains isolation and purification protocols. The two books below mainly

outline the many applications of GFP: for example, there are papers that describe how fusion proteins with GFP can be used to localize proteins within a compartment in a cell and to follow the transport of a particular protein through the cell.

Green Fluorescent Proteins
Kevin F. Sullivan and Steve A. Kay Editors
Academic Press - 1999
ISBN 0-12-6 7075-6

Methods in Enzymology Volume 302
Green Fluorescent Protein
P. Michael Conn, Editor
Academic Press - 1999
ISBN 0-12-182203-6

Green Fluorescent Protein: Applications
Barry W. Hicks (Editor)
Humana Press - 2002 - \$ 99.50
ISBN 0896039056

BOOKS ON WINE AND BEER MICROBIOLOGY

Jim DeKloe - Solano College

Fermentation began the field of biotechnology of course. These are the current references for wine and beer production from academics in the field who take this very seriously. The microbiology and chemistry in each is hard-core, and the target audience for most of these books is graduate students or researchers in the field.

Wine Microbiology and Biotechnology
Graham Fleet (Ed.)
Gordon and Beach Publishers (originally Harwood Academic Publishers) - 1993
ISBN 3718651327 - \$ 132

Wine Microbiology
Kenneth Fugelsang
Chapman and Hall - 1996
ISBN 0412066114 - \$ 150

Wine Microbiology
Claudio Delfini and Joseph V. Formica
Marcel Dekker Publishing - 2001 - \$ 79.95
0-8247-0590-4

Principles and Practices of Wine Making
Roger Boulton, Vernon Singleton, Linda Bisson, Ralph Kunkee
Chapman and Hall - 1996

ISBN 0412064111 - \$ 150
Brewing Microbiology - Second Edition
F. G. Priest and I. Campbell
Chapman and Hall - 1996
ISBN 0412591502 - \$ 124.95

Handbook of Brewing
William Hardwick
Marcel Dekker - 1995
ISBN 0824789083 - \$ 195

Brewing Fermentation
Roger Boulton
Routledge - due 1999
ISBN 0751403792 - \$ 184.95

The Alcohol Textbook
Ethanol Production by Fermentation and Distillation
Edited by T. P. Lyons, D. R. Kelsall and J. E. Murtagh
Nottingham University Press - 1995
ISBN 1897676557

Fermented Beverage Production
A. G. H. Lea and J. R. Diggat
Blackie Academic
ISBN 0-7514-0027-0

Yeast Technology
J. F. T. Spencer and D. M. Spencer (Eds.)
Springer-Verlag - 1989
ISBN 0387506896 (3540506896)

Winemaking: From Grape Growing to Marketplace
Richard P. Vine, Ellen M. Harkness, Theresa Browning, Cheri Wagner
Chapman and Hall Enology Library - 1997
ISBN 0-412-12221-9

Mikroskopische Beurteilung von Weinen und fruchtsaften in der Praxis
H. Huthi and U. Vetsch
Heller Chemie- und Verwaltungsgesellschaft - 1992
ISBN 3-9800498-2-5

Despite the title, this atlas contains all text in English, as well as German and French. This small book contains excellent photographs of the yeasts and bacteria that winemakers typically encounter in wine.

Principles of Brewing Science
George Fix , Marjorie Raizman
Brewers Publications - 1995 - \$ 29.95
ISBN 0937381179

Principles of Brewing Science: A Study of Serious Brewing Issues - 2nd Edition
George Fix, Frederick Gravetter, Larry Wallnau
Brewers Publications - 1999 - \$ 29.95
ISBN 0937381748

Brew Chem 101: The Basics of Homebrewing Chemistry
Lee W. Janson
Story Communications - 1996 - \$ 12.95
ISBN 0882669400

AGRICULTURAL BIOTECHNOLOGY

Food Inc.
Peter Pringle
Simon and Schuster – 2005
ISBN 978-0743267632

Seeds of Deception
Exposing Industry and Government Lies About the Safety of the Genetically Engineered Foods
You're Eating.
Jeffrey M. Smith
Yes! Books - 2003
0-9729665-8-7

BOOKS ON BIOETHICS OR BOOKS FROM THE OPPOSITION

The Biotech Century: Harnessing the Gene and Remaking the World
Jeremy Rifkin
Putnam - 1998
ISBN 087477909X - \$ 24.95 (hardcover)
ISBN 0874779537 - \$ 13.95 (paperback)
Lawyer Rifkin emerged in the late '70's and 80's as the leading critic of the biotech field. He makes a good “devil’s advocate.”

Against the Grain: Biotechnology and the Corporate Takeover of Your Food
Marc Lappe and Britt Bailey
Common Courage Press - 1998
ISBN 1567511511 - \$ 29.95 (hardcover)
ISBN 1567511503 - \$ 14.95 (paperback)

Lappe' has written several interesting books on health, agriculture, and the environment. This is

an interesting examination of the politics of genetically engineered crops.

Brave New Worlds: Staying Human in the Genetic Future

Bryan Appleyard

Viking Penguin Press - 1998 - \$ 23.95

ISBN 0670869899

Genetic Engineering, Dream or Nightmare: The Brave New World of Bad Science and Big Business

Hae-Wan Ho

Gateway Books - 1998

ISBN 07545452901 - \$ 24.00 (hardcover)

ISBN 1858600510 - \$ 14.95 (paperback)

Exploding the Gene Myth

Ruth Hubbard and Elijah Wald

Beacon Press - 1997 - \$ 14.00

ISBN 0807004294

The Human Body Shop: The Cloning, Engineering and Marketing of Life

Andrew Kimbrell and Bernard Nathanson

Harper San Francisco - 1998

ISBN 19930895264188 (paperback)

Altered Genes: Reconstructing nature: The Debate

Richard Hindmarsh, Geoffrey Lawrence, Janet Norton (eds.)

Allen & Unwin - 1998

Access to the Genome: The Challenge to Equality

Maxwell Mehlman and Jeffrey Botkin

Georgetown University Press - 1998

ISBN 0878406778 - \$ 39.95 (hardcover)

ISBN 0878406786 - \$ 14.95 (paperback)

The Ecological Risks of Engineered Crops

Jane Rissler and Margaret Mellon

MIT Press - 1996

ISBN

ISBN

Genetic Maps and Human Imaginations: The Limits of Science in Understanding Who We Are

Barbara Katz Rothman

W.W. Norton & Co. - 1998

ISBN 0393047032 - \$ 24.95

Owning the Future: Staking Claims on the Knowledge Frontier

Seth Shulman

Houghton Mifflin - 1999

ISBN 0395841755 - \$ 25.00

Biotechnology, Weapons and Humanity

British Medical Association

BMJ Bookshop - 1999

THE FOLLOWING SOUND INTERESTING (OR IMPORTANT) BUT I HAVEN'T
SCREENED THEM YET:

Maintaining Cultures for Biotechnology and Industry

Hunter-Cevera and Belt

Academic Press - 1996 - \$ 40

ISBN 0123619467

Safety in Industrial Microbiology and Biotechnology

Collin and Beale

Butterworth - Heinemann - 1992

ISBN 0-7506-1105-7

Is DNA Fingerprinting Accurate?

David Bender

Greenhaven Press - 1996 -

ISBN 1565104307

Ancient DNA - Recovery and Analysis of Genetic Material from Paleontological, Archeological, Museum, Medical, and Forensic Sources.

Bernd Herrmann, Editor

Springer-Verlag - 1994 - \$ 49.95

ISBN 0387943080

I haven't screened these yet:

Stem Cells: A Short Course

by Rob Burgess

Written by a leader in the field, this is a comprehensive text for students delving into the rapidly evolving discipline of stem cell research. Comprised of eight chapters, the text addresses all of the major facets and disciplines related to stem cell biology and research.

The Fundamentals of Scientific Research: An Introductory Laboratory Manual

Edited by Marcy A. Kelly

An invaluable resource to undergraduates majoring in the life sciences, this laboratory manual is geared towards first semester students enrolled in general biology courses focusing on cell biology. This laboratory curriculum centers on studying a single organism throughout the entire semester - *Serratia marcescens*, or *S. marcescens*

