An overview of MMG 445 – Basic Biotechnology

George Garrity
August 28, 2007

How is biotechnology defined?
Biotechnology may be further subdivided into various subcategories.

<table>
<thead>
<tr>
<th>Color</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Health, medical, diagnostics</td>
</tr>
<tr>
<td>Yellow</td>
<td>Food biotechnology, nutrition science</td>
</tr>
<tr>
<td>Blue</td>
<td>Aquaculture, coastal and marine biotech</td>
</tr>
<tr>
<td>Green</td>
<td>Agriculture, environmental biotech, biofuels, biofertilizers, bioremediation, and geomicrobiology</td>
</tr>
<tr>
<td>Brown</td>
<td>Arid zone and desert biotech</td>
</tr>
<tr>
<td>Dark</td>
<td>Bioterrorism, biowarfare, biocrimes, anticrop warfare</td>
</tr>
<tr>
<td>Purple</td>
<td>Patents, publishing, IPRs</td>
</tr>
<tr>
<td>White</td>
<td>Gene-based bioindustries</td>
</tr>
<tr>
<td>Gold</td>
<td>Bioinformatics, nanotechnology</td>
</tr>
<tr>
<td>Grey</td>
<td>Classical fermentation and bioprocessing technology</td>
</tr>
</tbody>
</table>


A little bit of background about the faculty.

George Garrity  
Training  
U Pittsburgh Graduate School of Public Health  
Polyoma virus transcription  
VA Medical Center, Pittsburgh, PA  
Molecular systematics, epidemiology  
Professional  
Merck & Co, Rahway, NJ  
Natural products screening, microbial resources group  
Editor-in-Chief, Bergey’s Manual  
MSU Professor  
Managing Member NamesforLife, LLC  
Research interests  
Microbial systematics, bioinformatics, data mining, nomenclature, annotation, ontologies, biopharmaceuticals
A little bit of background about the faculty.

Terry Marsh

Training
University of Massachusetts/Amherst
RNA-protein interactions
National Jewish Hospital, Denver CO
RNase P; catalytic RNAs

Professional
Hamilton College Co-director of Biochemistry-Molecular biology program
University of Illinois; Human Genome Senior Fellowship
Michigan State University; CME project laboratory

Research interests
structure of microbial communities, microbial diversity, genomic plasticity, metal reduction and transport by bacteria, bioremediation strategies

The objective of this session is to provide an overview of the course

Evolution of the course
Lectures
Source materials
Assignments
Performance evaluations
MMG-445 continues to evolve.

A principal goal of the course is to have each of you **actively** involved in learning about biotechnology.

In the past, we have accomplished this by incorporating student presentations, papers, debates, group projects, take-home and in-class exams.

Our focus was divided between enabling technologies and biotech businesses.

While the course has been well received by our students, we are continuing to fine-tune the course.

---

**Class composition**

![Class Composition Chart]

- **Graduate**
- **Senior**
- **Junior**

<table>
<thead>
<tr>
<th>Major</th>
<th>Graduate</th>
<th>Senior</th>
<th>Junior</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH/BHS/BT</td>
<td>12</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BHS</td>
<td>8</td>
<td>1</td>
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</tr>
<tr>
<td>CHEM</td>
<td>4</td>
<td>1</td>
<td>0</td>
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<tr>
<td>BIOGENECS</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>LBS BIOCHEM</td>
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<td>0</td>
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<tr>
<td>LBSBIOTECH</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>LBSMICRO</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MMG</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Papers and presentations will figure prominently again this year.

Why?
Writing and speaking skills are vital
Limited opportunities
Require practice and experimentation
So too, are critical reading and listening skills
Rarely taught
Also require practice and experimentation
Continue with an emphasis back to the science, but want you to also think about commercialization of the technology
Provide an opportunity for students to delve into a topic of interest in more depth
Production of an electronic journal to showcase your work
Scholarly journals are an integral part of research
Disseminate information, register precedence, maintain quality, provide archival versions for future reference.

Course organization.

Lectures will cover the following topics:
  Ramping up to speed
    Introduction to MMG 445
    Electronic literature tools and resources
    Writing, editing, presenting scientific information
    Review of the on-line publishing application
Enabling technologies
  Phylogenetics, bioinformatics, genomics, microarrays, and proteomics
Applications
  Biopharmaceuticals, bioremediation, bio-energy and chemical feedstocks, biocatalysis
  Real world applications of the technology
Student presentations
Course organization

Background
- Opening lecture
- Literature Resources
- Writing Editing Presentations

Enabling Technologies
- Phylogenetics
- Microbial ID
- Microbial Genomics
- Bioinformatics
- Microarrays
- Proteomics

Products & Processes
- Industrial Microbes
- Water Safety
- Bioremediation
- Expression Systems
- Biomimetic Interfaces
- Biosensors
- Biocatalysis

Your Contributions
- Biotechnology
- Applied Microbiology
- Pharmacology

What are the resources and materials that will be used in the class?

The MMG 445 homepage
Links to key resources
Class announcements
URL http://www.msu.edu/course/mmg/445

MMG 445 Basic Biotechnology eJournal
On-line journal produced by the class
Showcase your papers and presentations
Provide experience with real publishing system
Honors option

The Current Opinions and Trends series of journals
Concise and well-written mini-reviews
Starting point
We are going to be working hard, right from the beginning

The following are of special relevance to the class.

These are excellent texts that provide invaluable information about writing, editing and reviewing scientific papers, as well as presenting scientific papers. A companion website with some useful exercises is available at: http://www.writing.eng.vt.edu/exercises/index.html

PubMed and other web-based tools greatly simplify searching the literature and retrieving articles of interest. Tools like Endnote simplify the task of building local libraries of references, and creating, formatting and inserting bibliographies into your manuscripts.
Each student must complete the following three assignments.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review article</strong></td>
<td>Each student will write a review article covering an area of current research in the broad field of biotechnology in the format of the <em>Current Opinion</em> series.</td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>Each student will present their review paper to the class, in the form of a 20 minute mini-seminar.</td>
</tr>
<tr>
<td><strong>Scientific and editorial reviews</strong></td>
<td>Each student will be assigned to anonymously review three of their classmates' papers. They will also be responsible for reviewing the corresponding presentation.</td>
</tr>
</tbody>
</table>

### Preparation of the review article.

<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td>The paper should provide a concise (2250 word limit*), timely, and systematic review of major areas of research in biotechnology, focusing on developments occurring over the last few years. Paper should also provide the reader with a concise view regarding market readiness of the technology.</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>The paper should be restricted to one of the thematic areas covered in <em>Current Opinions in Biotechnology, Microbiology, or Pharmacology</em>.</td>
</tr>
<tr>
<td><strong>Instructions to authors</strong></td>
<td>Manuscripts <strong>must</strong> comply with the instructions to authors listed on the MMG 445 web site and the eJournal tracking system. Those that fail to conform will be rejected unedited.</td>
</tr>
</tbody>
</table>
Interpreting instructions to authors.

Format

Title page – You must include a descriptive title, your name, your department, and contact information (email).

Metabolomics and systems biology: making sense of the soup
Douglas B Kell

Novel techniques for acquiring metabolomics data continue to emerge. Such data require proper storage in suitably configured databases, which then permit one to establish the size of microbial metabolomes (hundreds of major metabolites and also unknowns, regulators and control of metabolic networks to be investigated. A variety of algorithms for metabolic network reconstruction coupled to suitable modeling algorithms are the ground substrates for the development of metabolic network and systems biology. Even qualitative models of metabolic networks, when subject to simplifications, constraints, can prove highly informative, and are the first step to the quantitative models, which above all allow the true representation of complex biochemical systems.

Address
Department of Chemistry, UMIST, P.O. Box 88, Manchester M60 1QD, UK
email: d.kell@umist.ac.uk

It is becoming increasingly apparent that our ability to generate large quantities of metabolomic or metabolic profiling data will help to open up many previously inaccessible areas of biology. However, such data are merely the inputs or ground substrates to systems designed to provide understanding or knowledge, and effecting this may require substantial changes in the conceptions and purely hypothesis-dependent, reductionist thinking that has hitherto been common [7,8]. Metabolomics is a burgeoning field (Figure 1), which produces voluminous data that, like other "omics" data, should be seen as a resource that can be filtered specifically to the former half of an intricate cycle of hypothesis-generating and hypothesis-testing phases [2,5,10] (Figure 2).

In this review, I highlight advances in the way we both gather and use metabolomic data for the large-scale reconstruction of biological systems and for the generation of biologically meaningful and the evolvable mod-
Interpreting instructions to authors.

Format
Title page – You must include a descriptive title, your name, your department, and contact information (email).
Abstract – 100 word limit

Metabolomics and systems biology: making sense of the soup
Douglas B Kell

Novel techniques for acquiring metabolomics data continue to emerge. Such data require proper storage in suitably configured databases, which then permit one to establish the size of microbial metabolomes (hundreds of major metabolites) and allow two-dimensional organization and control of metabolic networks to be investigated. A variety of algorithms for metabolic network reconstruction coupled to suitable modeling algorithms are the ground substances for the development of metabolic network and systems biology. Even qualitative models of metabolic networks, when subject to quantitative constraints, can provide highly informative and are the first step to the quantitative models, which allow a true representation of complex biochemical systems.

Addresses
Department of Chemistry, UMIST, Facstaff Building, Sackville St, P.O. Box 88, Manchester M60 1QZ, UK
email: dbkell@umist.ac.uk

It is becoming increasingly apparent that our ability to generate large quantities of metabolomic or metabolic profiling data will help to open up many previously inaccessible areas of biology. However, such data are merely the inputs to what is assumed to be a complex network designed to provide understanding or knowledge, and affecting this network require substantial changes in the conventional and purely hypothesis-dependent, reductionist thinking. Such changes have been referred to as “minerology” [1, 2]. Metabolomics is a burgeoning field (Figure 1), which produces voluminous data that, like other “omics” data, should be seen as a resource that can be used specifically to underlie half of an intricate cycle of hypothesis-generating and hypothesis-testing phases [3, 4, 5, 6] (Figure 2).

In this review, I highlight advances in the way we both gather and use metabolomic data for the large-scale reconstruction of biological systems and for the generation of both testable hypotheses and the explanatory mod-
Interpreting instructions to authors.

Format

Title page – You must include a descriptive title, your name, your department, and contact information (email).

Abstract – 100 word limit

Main body

Introduction – three paragraph limitation

Body – may be subdivided, but must demonstrate a logical flow of material

Conclusions - provide the reader with a brief summary of your views of the field and where the field is likely to head in the near future*

*There is an explosive growth of a woman during which

Getting the data

The first requirement is to have available techniques that

Making sense of raw metabolomic data

Developments in metabolic modelling

Although we ultimately need to solve the inverse problem [10], metabolic modelling in the 'forward direction', type [11] and

Metabolic network organisation and reconstruction

Recognising that metabolites and metabolites are system

Integrating metabolomics into systems biology

Although such ideas are very far from being new, there is a huge interest in understanding

Some applications

While the metabolomics data constitute the 'grand subtext' of the information,
Interpreting instructions to authors.  

Format  
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Main body  
Introduction – three paragraph limitation  
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Conclusions - provide the reader with a brief summary of your views of the field and where the field is likely to head in the near future  
Acknowledgements – recognize sources of support, advice, and assistance provided by colleagues.  

Acknowledgements  
I thank Karen Tanmura and Warwick Dunn for assistance with literature gathering and essay construction, respectively; Warwick Dunn and Terry Spear for commenting on the manuscript; my colleagues for very useful and stimulating discussions; and the BBSRC, EPSRC, and NERC for financial support.

Interpreting instructions to authors.  

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Acknowledgements – recognize sources of support, advice, and assistance provided by colleagues.  

References and recommended reading – must conform to the with Current Opinions style. References of special significance must be annotated (minimum of five).
Interpreting instructions to authors.

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Title page – You must include a descriptive title, your name, your department, and contact information (email).

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Tables – limited to two. Tables must be numbered, referenced in the text, and include a title.
More on interpreting instructions to authors.

Figures – limited to two. Figures must be numbered, referenced in the text, and include descriptive legend.

Referenced in text

Bibliometric and text mining analysis of the recent metabolomics literature (to the end of 2003). (a) The growth in metabolomics papers judged by searching titles and abstracts of Web of Knowledge using ‘metabolon’ as the search term. (b) Text mining analysis of the metabolomics literature. The text mining tool Hall Viz (Delphi Scientific) was used to cluster, according to their keywords, papers that had ‘metabolism’ or ‘metabolomic’ in their title. The main groupings seem to be based on whether the emphasis is on technologies, an integration with other omics, or in predicting higher order properties such as disease.

Legend must stand alone
More on interpreting instructions to authors.

Figures – limited to two. Figures must be numbered, referenced in the text, and include descriptive legend.

List of abbreviations – Non-standard abbreviations must be listed.
More on interpreting instructions to authors.

Figures – limited to two. Figures must be numbered, referenced in the text, and include descriptive legend.
List of abbreviations – Non-standard abbreviations must be listed
Names of organisms
   Prokaryotes – all ranks italicized, in conformance with the International Code of Prokaryotes or Bergey’s Taxonomic Outline
   Eukaryotes – genus and species italicized, higher ranks upright, in conformance with the Botanical or Zoological Codes
Sequence accession numbers – should resolve to the correct information

More on interpreting instructions to authors.

Figures – limited to two. Figures must be numbered, referenced in the text, and include descriptive legend.
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   Eukaryotes – genus and species italicized, higher ranks upright, in conformance with the Botanical or Zoological Codes
Sequence accession numbers – should resolve to the correct information

Submission
   Date – by 5 PM on day before assigned seminar date
   Form – electronic, MS Word or rich text format; graphics as tiff, jpeg, or png.
   Where – MMG 445 eJournal site
   Revisions – 7d after receipt of reviewer comments, if required.
A cautionary note about plagiarism.

In submitting a manuscript, student authors warrant that the work is both original and solely their own. Student authors also warrant that they have not incorporated the work of others into their submission and that the paper has not be submitted elsewhere.

The MSU policy on plagiarism
http://www.msu.edu/unit/ombud/plagiarism.html

What to reference
Direct quotations
Verbatim excerpts of more than 50 words*
Writings of others
Previous writing of your own
Data sets
Tables, figures, and calculations

A cautionary tale.

The New York Times
April 27, 2006
Is It Plagiarism, Or Teenage Prose?

To the Editor:
It comes as no surprise to any faculty member who uses writing as part of the curriculum to learn that yet another author has been caught plagiarizing. It is an old problem that is rampant in contemporary society.

So, too, are the claims that such acts were unintentional or caused by undue pressure to perform in the classroom or on the job.

Interestingly, those who get caught never confess that the benefits they gained by cheating were also unintentional. Copying the work of another is a conscious act. It is unacceptable without proper attribution. It is also increasingly easy to discover.

When that happens, faculty, editors, publishers and institutions of higher learning must deal with plagiarism swiftly and publicly.

As such, we are deeply indebted to those who brought to light the case of Kanva Viuswamidu. She will be a good example of the fate of plagiarism with consequences.

George M. Gaitty
Terence L. Mabti
East Lansing, Mich., April 25, 2006

The instructors teach microbiology and molecular genetics at Michigan State University.
But, plagiarism isn't just limited to students…

Plagiarism is a form of misconduct and carries severe penalties

NIH definition of Research Misconduct

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabrication</td>
<td>Making up data or results and recording or reporting them.</td>
</tr>
<tr>
<td>Falsification</td>
<td>Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.</td>
</tr>
<tr>
<td>Plagiarism</td>
<td>The appropriation of another person’s ideas, processes, results, or words without giving appropriate credit.</td>
</tr>
</tbody>
</table>

The OSTP Policy defines “research misconduct” as “fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results” (see accompanying box for details). It also sets the legal threshold for proving charges of misconduct.

Steneck, NH. 2006. ORI Introduction to the Responsible Conduct of Research, Office of Research Integrity, Department of Health and Human Services.
...part of which is public exposure, shame, and financial penalties

Ali Sultan, M.D., Ph.D., Harvard School of Public Health: On October 19, 2004, the U.S. Public Health Service (PHS) entered into a Voluntary Exclusion Agreement with the President and Fellows of Harvard College (Harvard) and Ali Sultan, M.D., Ph.D., former Assistant Professor of Immunology and Infectious Diseases at the Harvard School of Public Health (HSPH). Based on HSPH's inquiry report, the respondent's admission, and additional analysis conducted by ORI in its oversight review, PHS found that Dr. Sultan engaged in scientific misconduct in research funded by National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH), grant 1 P01 AI06032-01, "Chemical genetics and malaria drug development." Subproject 2, "Screening of target-rich environment." Specifically, PHS and Harvard found that: (1) Dr. Ali Sultan plagiarized text, plagiarized three figures showing results of an immunofluorescence assay, a phosphorimage, and Northern blot analysis (Figures 3, 4, and 5, respectively), and falsified the data as results of experiments on Plasmodium berghei, instead of P. falciparum as reported in a subproject of the PHS grant application 1 P01 AI06032-01, "Chemical genetics and malaria drug development," and (2) Dr. Ali Sultan fabricated portions of an e-mail from his postdoctoral student that he presented to the HSPH inquiry committee purportedly to falsely implicate the student in the submission of the plagiarized materials for the grant application.

The Voluntary Exclusion Agreement states that for a period of three (3) years, beginning on October 19, 2004: (1) Dr. Sultan agreed to exclude himself from any contracting or subcontracting with any agency of the U.S. Government and from eligibility or involvement in nonprocurement programs of the U.S. Government as defined in the debarment regulations at 45 CFR Part 76; and (2) Dr. Sultan agreed to exclude himself from serving in any advisory capacity to PHS including, but not limited to, service on any PHS advisory committee, board, and/or peer review committee, or as a consultant.

Source NIH Office of Research Integrity

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**Preparation for the seminar**

**General**

Based on the topic of your review article

- Concise,
- Polished
- Strict time limit
  - 20 min presentation
  - 5 min Q&A

**Objective**

- Tell a complete “story”
  - Introduction
  - Middle
  - Strong conclusions
- Engage the audience
  - Focus on the science
- Visuals must support, not distract
**Guidelines for creating your “slides”:**

<table>
<thead>
<tr>
<th>Software</th>
<th>PowerPoint is recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternatives</td>
<td>Keynote</td>
</tr>
<tr>
<td></td>
<td>Adobe Acrobat</td>
</tr>
<tr>
<td></td>
<td>Browser-based</td>
</tr>
<tr>
<td>Templates</td>
<td></td>
</tr>
</tbody>
</table>

**Objective**

| Slides support spoken word |
| Clarify ideas |
| Provide necessary data |

---

**Some helpful suggestions from the ASM.**

**Do**

- Keep it simple
- Be brief
- Use mixed case lettering
- Vary font size for emphasis
- Use sans serif fonts
- Use the same fonts throughout
### Some helpful suggestions from the ASM.

<table>
<thead>
<tr>
<th>Do</th>
<th>Keep it simple</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Be brief</td>
</tr>
<tr>
<td></td>
<td>Use mixed case lettering</td>
</tr>
<tr>
<td></td>
<td>Vary font size for emphasis</td>
</tr>
<tr>
<td></td>
<td>Use sans serif fonts</td>
</tr>
<tr>
<td></td>
<td>Use the same fonts throughout</td>
</tr>
<tr>
<td></td>
<td>Use the same color scheme throughout</td>
</tr>
</tbody>
</table>

| Do not                                  | Use more than three fonts per slide |
Some helpful suggestions from the ASM:

**Do**
- Keep it simple
- Be brief
- Use mixed case lettering
- Vary font size for emphasis
- Use sans serif fonts
- Use the same fonts throughout
- Use the same color scheme throughout

**Do not**
- Use more than three fonts per slide
- Use busy or textured backgrounds
- Use background colors that compete with text
Some helpful suggestions from the ASM.

Do

Keep it simple
Be brief
Use mixed case lettering
Vary font size for emphasis
Use sans serif fonts
Use the same fonts throughout
Use the same color scheme throughout

Do not

Use more than three fonts per slide
Use busy or textured backgrounds
Use background colors that compete with text
Use ornate fonts

SOME HELPFUL SUGGESTIONS FROM THE ASM.

DO

KEEP IT SIMPLE
BE BRIEF
USE MIXED CASE LETTERING
VARY FONT SIZE FOR EMPHASIS
USE SANS SERIF FONTS
USE THE SAME FONTS THROUGHOUT
USE THE SAME COLOR SCHEME THROUGHOUT

DO NOT

USE MORE THAN THREE FONTS PER SLIDE
USE BUSY OR TEXTURED BACKGROUNDS
USE BACKGROUND COLORS THAT COMPETE WITH TEXT
USE ORNATE FONTS
USE ALL CAPITAL LETTERS
Some helpful suggestions from the ASM.

Do
- Keep it simple
- Be brief
- Use mixed case lettering
- Vary font size for emphasis
- Use sans serif fonts
- Use the same fonts throughout
- Use the same color scheme throughout

Do not
- Use more than three fonts per slide
- Use busy or textured backgrounds
- Use background colors that compete with text
- Use ornate fonts
- Use all capital letters
- Use unnecessary graphics

Michael Alley’s ten critical errors.

Flawed speech
- Giving the wrong speech
- Drawing words from the wrong well

Flawed structure
- Leaving the audience at the dock
- Losing the audience at sea

Flawed visual aids
- Projecting slides that no one reads
- Projecting slides that no one remembers
- Ignoring Murphy’s law

Flawed delivery
- Not preparing enough
- Not paying attention
- Losing composure
## Planning and packaging your presentation

<table>
<thead>
<tr>
<th>Time constraints</th>
<th>Preparation time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planning the layout</td>
</tr>
<tr>
<td></td>
<td>Building a template</td>
</tr>
<tr>
<td></td>
<td>Creating the slides</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
</tr>
<tr>
<td></td>
<td>Revision</td>
</tr>
<tr>
<td></td>
<td>The importance of a projection test</td>
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</table>

<table>
<thead>
<tr>
<th>Packaging</th>
<th>Copying to single folder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Graphic links</td>
</tr>
<tr>
<td></td>
<td>Web links</td>
</tr>
<tr>
<td></td>
<td>CD, USB “memory stick”, or AFS space</td>
</tr>
</tbody>
</table>

## Peer review of manuscripts

<table>
<thead>
<tr>
<th>Objective</th>
<th>Provide constructive criticism to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The author</td>
</tr>
<tr>
<td></td>
<td>The editor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Scientific content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clarity of writing</td>
</tr>
<tr>
<td></td>
<td>Scope of manuscript</td>
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<tr>
<td></td>
<td>Conformance to style sheet</td>
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<table>
<thead>
<tr>
<th>Reviewer report</th>
<th>Mark unclear sections (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mark scientifically unsound sections (if any)</td>
</tr>
<tr>
<td></td>
<td>Check tables, figures, references</td>
</tr>
<tr>
<td></td>
<td>Complete and submit reviewer report</td>
</tr>
<tr>
<td></td>
<td>Due within six days of assignment</td>
</tr>
</tbody>
</table>
Some suggestions for reviewing manuscripts.

Do
Complete the exercises on Alley’s web site
Read separately for content and style
Carefully word your comments
Support your recommendation
  Accept
  Revise
  Reject

Do not
Discuss your review with the author or others
Attack the author personally
Delay your review

Peer review of seminars

Objective
Provide constructive criticism to:
  The speaker
  The convener

Evaluation criteria
Scientific content
Clarity of expression
Understanding of the material
Preparation and use of visuals
Response to questions

Reviewer report
Complete and submit reviewer report
Due within 24 of assignment

Reviewer Assignment
Randomized design, without replacement
Notification by email on day of presentation
How will your performance be evaluated?

Review article  
- 30% of grade  
  - Accept (4.0)  
  - Accept with minor revision (3.0 – 3.5)  
  - Accept with major revision (2.0 – 2.5)  
  - Reject (0.0 – 1.5)

Presentation  
- 30% of grade  
  - Technical accuracy  
  - Presentation style  
  - Response to questions

Peer reviewing  
- Accuracy and thoroughness  
- Timeliness of reviews

Participation  
- Attendance and contribution to class discussions

So, where to start…

Biotech is about Application of biological knowledge to create products and processes that solve real problems and have commercial value.

Examples

- Biofuels: EtOH, biodiesel, synthetic genes, synthetic bacteria, fatty acids -> crude oil, fatty acids -> gasoline
- Personalized medicine and theragnostics
- Disruptive technologies/innovations