USC Viterbi SHINE 2019
Annotated Bibliography Assignment
The Research Cycle

- Research Question
- Literature Review
- Methods
- Results/Discussion
- Communication: Peer Review, Poster
SHINE 2019 Assigned Readings

Resources
- How to read a Scientific Paper -- SHINE Handout
- Natalia Rodriguez - Infographic: How to read a scientific paper
- Overview of Scholarly Literature-Powerpoint

Reading Assignment
- SHINE 2019 Annotated Bibliography Assignment Due
  7/17/19
- Link to upload your Annotated Bibliography Assignment
Annotated Bibliography Assignment – Due 7/17/19

Introduction to Library Research: As you engage in laboratory research during SHINE, you are refining important skills and performing the scientific method in action. But the goal of lab research is to share it with other researchers and therefore build on the existing body of scholarly knowledge. Starting in Week 1, your professors and Ph.D./postdoctoral mentors have introduced you to peer-reviewed scientific studies pertinent to your SHINE lab. Today (6/28), we will meet with Science Librarians Dr. Shalini Ramachandran and Cari Lyle to learn how to access USC library databases to further refine your research on a topic of your choice. Their aim is to prepare you to conduct your own academic literature searches and delve more deeply into your area of SHINE research or any research topic that interests you. The databases you will explore provide convenient access to published scholarly literature, but this access also costs money, so you will need an institutional subscription to do so. During your time at SHINE, you have been granted institutional access, courtesy of USC’s Associate Dean of Public Services, Ruth Wallach. But if you are having any trouble accessing material to help you complete your annotated bibliography assignment, please contact ITS about your NET ID error at 213-740-5555 and/or ask your Ph.D. mentors to help you access these files. You should also ask your mentors about how they themselves conduct a literature search, which databases they find useful, and how they use a literature search in their research.

Assignment details: On Wednesday, July 17, we ask you to please submit an Annotated Bibliography of 2-3 sources you found that interest you. If you’d like, you can search the databases for more studies by your professor or Ph.D. mentor, or you can look up a reference mentioned in any of the articles you have already read, or you can look up an entirely different field to satisfy your curiosity about other areas of research. For each entry, please include a citation in APA (American Psychological Association) style of your source and a paragraph summarizing the source in question, including reference to the study’s IMRAD.
Sample APA Annotated Bibliography

Battle, K. (2007). Child poverty: The evolution and impact of child benefits. In Covell, K., & Howe, R. B. (Eds.), A question of commitment: Children's rights in Canada (pp. 21-44). Waterloo, ON: Wilfrid Press, Laurier University. Mention of the methods used by Ken Battle draws on a close study of government documents, as well as his own research as an extensively-published policy analyst, to explain Canadian child benefit programs. He outlines some fundamental assumptions supporting the belief that all society members should contribute to the upbringing of the children. His comparison of child poverty rates in a number of countries is a useful wake-up to anyone assuming Canadian society is doing a good job of protecting children. Battle pays particular attention to the National Child Benefit (NCB), arguing that it did not deserve to be criticized by politicians and journalists. He outlines the NCB’s development, costs, and benefits, and laments that the Conservative government scaled it back in favor of the inferior Universal Child Care Benefit (UCCB).

To assess the toxicity and clearance of peptide amphiphiles, researchers at the University of Chicago and UC Berkeley intravenously administered two different types of peptide amphiphile micelles, CREKA (Cys-Arg-Glu-Lys-Ala) micelles (cy7-labeled micelles containing the peptide CREKA) and non-targeting micelles (NT), control micelles lacking a peptide, in ApoE knock-out mice to examine their biocompatibility, biodistribution, and clearance. Results revealed that the micelles were cleared through the renal system, that both types of micelles were mostly found to be in the liver and kidney, and that no tissue damage was observed via histology in the mice injected with either NT or CREKA micelles. This article is significant because according to the authors, it was the first study in which the *in vivo* biodistribution, clearance, and toxicity of peptide amphiphiles were analyzed.
Citation help:

• Purdue Owl (Online Writing Lab) – a great site for guides to all of the citation styles
  • [https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_basic_rules.html](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_basic_rules.html)
  • They have an automatic citation generator, but BEWARE of these – always double check them against the style guide.
A word on citations:

The “hanging indent”: a common style convention for References pages

<table>
<thead>
<tr>
<th>Category</th>
<th>Excellent</th>
<th>Commendable</th>
<th>Satisfactory</th>
<th>Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td>Annotations provide a thorough but concise summary of the topic and main arguments presented in each source.</td>
<td>Annotations provide a brief and/or basic summary of the topic and main arguments presented in each source.</td>
<td>Annotations provide some information concerning the topic and main arguments presented in each source.</td>
<td>Annotations provide little to no information concerning the topic and main arguments presented in each source.</td>
</tr>
<tr>
<td><strong>Quality of Sources</strong></td>
<td>Sources are professional and reliable (peer-reviewed or similar quality). They are acceptable for research purposes.</td>
<td>Sources are professional but not reliable. They would not necessarily be recommended for research purposes.</td>
<td>Sources are neither professional nor reliable. They would not be acceptable to use for research.</td>
<td>No sources are given.</td>
</tr>
<tr>
<td><strong>Significance of Source</strong></td>
<td>Annotations reference the greater significance of the source and/or its relationship to the chosen research topic.</td>
<td>Annotations present a brief and/or basic reference to the greater significance of the source and/or its relationship to the chosen topic.</td>
<td>Annotations present some reflection on the source’s greater significance and/or its relationship to the chosen research topic.</td>
<td>Annotations present little to no reflection on the source’s greater significance and/or its relationship to the chosen research topic.</td>
</tr>
<tr>
<td><strong>Readability of Annotation</strong></td>
<td>Annotation is very well written, concisely phrased and clear in its articulation of the topic explored and source summarized. Perfect or very few word choice issues. Very readable.</td>
<td>Annotation is well written and makes a good effort to be clear and concise in its phrasing. Despite some word choice issues, the entry is readable.</td>
<td>Annotation displays some issues with readability, clarity, and/or concision. More revision for logic and flow of sentences is recommended.</td>
<td>Annotation is difficult to understand due to word choice issues, problems with logical flow, and/or lack of clarity in phrasing. Extensive revision is recommended.</td>
</tr>
<tr>
<td><strong>APA Citation Formatting</strong></td>
<td>APA format contains no or very few errors. The reader would be able to find the article referenced.</td>
<td>APA format contains several errors. The reader would have to make several search attempts to find the article referenced.</td>
<td>Consistent errors in APA format. Reader would struggle to find the article referenced.</td>
<td>APA format is not attempted.</td>
</tr>
</tbody>
</table>
!!!HAPPY BIRTHDAY!!!

!!!Justin Jang!!!
3 Sentence Challenge: ROUND 2

- Take out a blank document
- Spend no more than 7 minutes
- Write a 3-sentence description of your Professor’s research and your role in it.
- On Google Drive, post your new description under your description from last week and date it to differentiate from last week. 😊
3-Sentence Challenge Google Doc Link:

https://docs.google.com/document/d/1yMQjb3NbzACjQhMzZYrnNj9os3EHQ8mv3hcngz1CLPM/edit?usp=sharing
Announcements for Next Weeks:

Thursday & Friday: Campus closed for 4th of July—no SHINE—have fun!!

Wed. 7/10/19: Dr. Herrold office hour, 10 – 11 AM RTH Café
-Office hours are chill—please utilize them now & @college

Fri. 7/12/19: Supercomputing & Chemical Engineering workshop with Professor Sharada MCB 102

Wed. 7/17/19: Annotated Bibliography Due! Cohort-wide meeting – Professor Nikolaidis Workshop on Robotic-Arm
Anyone having trouble obtaining their NET IDs?

- I want names
- Call ITS & lodge ticket:
  - 213-740-5555
- In meantime: ask your SHINE Mentor for help (they have login credentials)
Welcome
Dr. Shalini Ramachandran
and Ms. Cari Lyle!
Development of Multi-Electrode Neural Probes for Rat Hippocampal Recordings

Leo Slew, slolew@gmail.com
Glen A. Wilson Class of 2016
University of Southern California, Department of Biomedical Engineering

Introduction
The primary purpose of MEMS is to engineer extremely miniscule technology, which can be implemented in the medical field. Our research objective strives to fabricate a neural probe designed to observe the neural networks responsible for the formation of memories in the hippocampus. The process to create a device capable of recording electrical signals within a rat's brain is a long and complex one. First, we created brain probes using the process of photo-lithography. We designed and fabricated flexible, multi-electrode Polyimide probes to record spikes from the Cornu Ammonis (CA) areas CA1 and CA3 and the Dentate Gyrus (DG) regions of rat hippocampus.

Neural Probe Fabrication

- Probes were microfabricated using photolithographic techniques (Fig. 5).
- Parylene served as the base substrate and insulation layer for our devices.
- Platinum electrode recording sites, traces, and contact pads will be lithographically patterned on top of the base layer using e-beam deposition at a thickness of 2,000 Å, followed by lift-off.
- Electrodes and contact pads will be subsequently exposed by DRIE and the probes will be cut out from the substrate.

Research Process

- After we complete all elements of our design, we will send the file to a fabrication house. The fabrication house uses our file to create a printed-circuit board, which will be used in our device to encode the memories from a rat into data readable by computers.

Objectives

1. Fabricate flexible neural probes:
   - Recording probes is a traumatic event for the brain, which causes a scar and death zone to form around the recording sites and limits the probe's ability to obtain neural signals.
   - Using a more flexible material, rather than the traditional metal substrates, attenuates this damage.
   - We use Parylene, a USP Class VI material that is flexible and microencapsulated to conduct the devices.

2. Test various techniques to provide temporary stiffness to neural probes:
   - Flexible probes must be temporarily stiffened during insertion to prevent damage to neural tissue.
   - A tissue compliant probe could be used to provide temporary stiffness.

3. Design a printed-circuit board to connect probes to electrical recording system:
   - We will be using software to design our printed-circuit boards, which will be part of our electrical recording system.

Fabrication of PCB for Electrically Connecting Probes to Neural System:

- Eagle is used to develop printed-circuit boards and molds for our device.
- We used Eagle to create multiple parts for our device. This includes schematics, devices, symbols, and packages.
- After we complete all elements of our design, we will send the file to a fabrication house. The fabrication house uses our file to create a printed-circuit board, which will be used in our device to encode the memories from a rat into data readable by computers.

Reliability to My STEM Coursework

The research we did at the lab involves heavy use of theoretical knowledge to comprehend. For example, when we were exploring different options of inserting our probes into the brain phantom gel, we came up with the possibility of utilizing magnetism. Background knowledge from my Advanced Placement physics class provided valuable insight. Without this knowledge, I would not have been able to communicate with my fellow peers in the lab. In addition, our lab group wanted to find the forces of insertion of the probe. Again, my experience from Advanced Placement physics provided me the ability to suggest mechanics-based solutions to the given problem. Such solutions included the use of the impulse-momentum formula, as well as Newton's second law. The scientific method was also presented to me at a higher level. Overall, my research abilities were greatly enhanced and also increased in formality. In high school, this will give my lab reports an edge compared to my other peers. The scientific integrity of my lab report will increase, due to the overlapping factors between high school and university sciences. Overall, my background knowledge from high school courses was beneficial in my participation.

Future of Project

The device will undergo many realistic, partially fabricated probes and traces. After the device is successfully fabricated, it will be tested on a live rat. The device is expected to analyze brain waves and neuron firing in the rat's hippocampus. This beneficial data will contribute to the study of formation of memories in the brain. Eventually, if the project proves to be efficient, there is a possibility of commercialization. This may benefit millions of lives, including but not limited to, people who suffer from Alzheimer's disease. Other memory-related disorders may also be treated with this device.

Acknowledgements

Dr. Ellis Meng, Anhui Wettman, David King, Huijing Xu, Craig Timms, Dr. Katie Mills, Luping Wang, Biomedical Microsystems Lab, Nancy Chea.