School of Molecular & Cellular Biology

MCB 460, Spring 2023
Neuroanatomy Laboratory, 2 Credit Hours

Instructor
Jeremy Toma, PhD
Office: 175C Burrill Hall
Email: jtoma@illinois.edu. Phone: 217-333-9026

Class Meeting Schedule
Scheduled Class Time: Wednesday 1-4:50 pm
Location: 216 Burrill Hall
Office Hours: TBD. You are welcome to stop by my office any time. The best way to reach me is by email to arrange a meeting or to ask a question; I am also available to meet by Zoom. I will do my best to respond to your email within 24 hrs.!

Course Overview and Description
This laboratory course will emphasize the fundamentals of neuroanatomy in a highly interactive and engaging way. To this end, you will have the opportunity to work with human brains and compare the structures to those of other animals. The major sensory, motor, and integrative neural systems of the human brain are explored. Based on an understanding of normal neural connections and brain function, the anatomical and physiological bases for multiple neurological disorders are also discussed. Primary literature and clinical case studies will inform discussions throughout the course. By the end of this course, you will gain an appreciation for the complexity of the human nervous system and a deeper understanding of the relationships between nervous system structure, function, and neuropathology.

Course Prerequisites
MCB 314 or permission of the instructor

Student Learning Outcomes
At the end of the course, through assignments, discussions, activities and assessments, you will be able to:

- Identify and draw key pathways/tracts and structures related to important functions of the human nervous system.
• Understand the functions of these pathways/tracts and draw conclusions about the relationships between structure and function in the nervous system.

• Understand how pathology of the nervous system affects both structure and function.

• Apply your understanding of neuroanatomy to case studies of neuropathology.

• Integrate your understanding of human neuroanatomy and neuropathology through a creative project.

• Perform dissections of human and other animal brains and compare and contrast the structures.

• Understand how we know what we know about human neuroanatomy and understand the limitations of the techniques used to study the human nervous system.

• Use your understanding of neuroanatomy to interpret functional and structural images of the nervous system, including representative images of various neuropathologies.

• Read and discuss primary and secondary scientific literature sources related to a relevant topic in neuroanatomy. You will be able to apply your understanding of this literature to critically assess claims made in the media and popular culture about the human brain.

• Demonstrate oral and written skills as they pertain to analyzing and synthesizing scientific literature.

Course Text/Materials Information

All other course material for use in class will be provided to you either through the course website or as handouts during class time. You will need to access literature (both primary and secondary sources) for your written and oral assignments, likely through PubMed (https://pubmed.ncbi.nlm.nih.gov/) or Google Scholar. We will discuss acceptable sources and how to find them in class.

Course Website, Course Tools (Canvas, Moodle, LON-CAPA, Zoom, etc.)
Course materials will be provided on our course website on Canvas (https://canvas.illinois.edu/). To log in, use your NetID and NetID password. Material will be updated regularly, so please make sure to check the course website often. You should receive notification of updates to your university email account.

Grading Information and Breakdown
The course grade will consist of 1000 points, with opportunities for a few bonus points throughout the semester.

Pre Lab Tutorials and Quizzes (Participation Only) 75 pts
In Lab Assignments/Case Studies 200 pts
Notes on Course Design and Inclusion

This course is designed with a growth mindset, which means that your competencies with respect to the course content and skills are expected to improve as the course progresses. As a result, you will be given every reasonable chance to succeed! Neuroanatomy can seem overwhelmingly complex (because it is!) but with practice and hard work, you will succeed in this course.

To aid in your learning, practice is built into the course design. You will be responsible for completing the pre lab assignments, which will introduce the weekly topics. We will then work together through the topics during the lab, and finally you will have post lab assignments that will help solidify topic concepts. It may seem like lots of work on a weekly basis, but we know that repeated exposure to topics is best for learning. It will also cut down on study time right before the exams. The other components of the course listed above will improve your critical thinking, writing, and oral presentation skills.

Throughout the course, we will gather feedback to make sure we are on track with our learning outcomes. Feedback will also be critical to me as I want this course to be as inclusive as possible, meaning I don’t want anyone to be left behind as we proceed. If things aren’t going well, I want to adjust our approach to improve the learning environment. This may involve modifying the structure or grading of the assignments, or the way we work through the course material. With all of this in mind, it is my hope and expectation that all of you will take something valuable away from this course!

Pre Lab Tutorials and Quizzes (Participation Only)

Prior to each lab, you will be assigned a tutorial and quiz to work through in order to prepare for class. The scores you receive here will not count towards your grade, but your participation will. More details will be provided the first class.

In Lab Work Assignments/Case Studies

In lab, we will work through various assignments and activities that focus on the weekly course topics. Examples include brain dissections, drawingsetLabeling pathway diagrams, discussing scientific papers and working through case studies. In some instances, the assignment will involve participation only. More details will be provided the first day of class.

Post Lab Assignments

Following each class, you will work through a variety of assignments related to the topics covered in that week’s lab. In the first week, this will include a required lab safety quiz. Some examples include pathway drawing assignments, comparing images of brains, and short quizzes that will model the sorts of questions you will see on the exams. These assignments will be due by the beginning of the following week’s lab. Details about the nature of these assignments will be provided the first day of class.

Written Paper Assignment
Our understanding of neuroanatomy is based on scientific research, and how that research has been conducted will be the major focus of this assignment. You will be responsible for choosing a topic related to neuroanatomy and writing a paper to explore the science behind that topic. A detailed grading rubric for this assignment, including suitable topics to choose, will be provided early in the semester. This assignment will require you to synthesize primary and secondary resources from the literature.

**Oral Presentation**
At the end of the semester, you will present an oral presentation based on the topic and research you conducted for your written paper assignment. The details for this assignment, including a grading rubric, will be provided early on in the semester.

**Exams**
These will be based on material from the textbook as well as from the drawing exercises and case studies that we will do in class, so you will have ample opportunity to practice examinable content as we work through the course. Content and question formats will be clearly communicated to you well in advance of the exam date. The final exam is cumulative and keeping in line with the growth mindset of this course, if you perform better on the final than the midterm, your midterm exam grade will be dropped.

**Creative Term Project**
Neuroanatomy underlies many core features of our human nature, including our creative abilities. For this term project, you will create an artistic project that demonstrates your understanding of human neuroanatomy. You will choose a topic related to the course material, with projects that demonstrate integration of course content and concepts across multiple topics being strongly encouraged. For example, think of the relationships between structure/form and function, and neuropsychology and dysfunction. Examples of creative media include: drawings (digital graphic design, sketches, posters or prints), paintings, written creative work such as poetry, music, carvings, 3D prints, etc. This list is not exhaustive, and no one medium is favored. A clear rubric will describe the grading scheme early on in the course, so you will be aware of what elements to include in your project. **Artistic ability will not be a prerequisite for getting a good grade!**

**Grade Scale**
The Standard Grade Scale below describes how grades will be assigned. It is possible that the grade scale will be adjusted “downwards” in the event the class does poorly on an exam or assignment, but grades will never be adjusted “upwards”, meaning more points than indicated in the following table would be needed to achieve a given grade.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Point Ranges</th>
<th>Grade Point Value</th>
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<tbody>
<tr>
<td>A+</td>
<td>1000–920</td>
<td>4.000</td>
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<tr>
<td>A</td>
<td>919–883</td>
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<tr>
<td>A-</td>
<td>882–850</td>
<td>3.667</td>
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<tr>
<td>B+</td>
<td>849–817</td>
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<tr>
<td>B</td>
<td>816–783</td>
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<tr>
<td>B-</td>
<td>782–750</td>
<td>2.667</td>
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<tr>
<td>C+</td>
<td>749–717</td>
<td>2.333</td>
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<tr>
<td>C</td>
<td>716–683</td>
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<tr>
<td>D+</td>
<td>649–617</td>
<td>1.333</td>
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### Tentative Course Calendar

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Associated Neuropathology</th>
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| 1 (1/18) | Course intro/syllabus  
Key neuroanatomical terminology  
Intro to the brain: overview of superficial structures of the brain and brainstem.  
Intro to vascular supply.  
Compare human, sheep and pig brain surface anatomy. | Intro to Neuropathology |
| 2 (1/25) | Intro to internal structures.  
Somatosensory cortex and pathways. | Spinal Cord/Brainstem Injuries I, injuries to somatosensory cortex  
Multiple Sclerosis |
| 3 (2/1) | Movement I: Primary and accessory motor cortices, motor pathways. | Spinal Cord/Brainstem Injuries II, injuries to motor cortex  
Amyotrophic Lateral Sclerosis |
| 4 (2/8) | Movement II: Basal ganglia, cerebellum. | Huntington’s Disease  
Parkinson’s Disease |
| 5 (2/15) | Visual pathways; olfactory pathways | Blindness,  
Anosmia |
| 6 (2/22) | Auditory and vestibular pathways. | Deafness,  
Vertigo |
| 7 (3/1) | Limbic System: emotions, memory. | Epilepsy,  
Amnesia |
| 8 (3/8) | Midterm Exam | |
| 9 (3/15) | Spring Break - No Lab | |
| 10 (3/22) | Thought, language, and consciousness. | Aphasia, Dementia (Alzheimer’s Disease),  
Schizophrenia |
Autonomic Nervous System. | Sleep disorders (narcolepsy) |
| 12 (4/5) | Peripheral Nervous System, including Cranial Nerves.  
Enteric Nervous System. | Cranial neuropathies  
Enteric neuropathies |
| 13 (4/12) | Lab activity - Tissue analysis | |
New technologies and advances related to neuroanatomy.  Recent advances in treatments of injuries to the nervous system.

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<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 (4/19)</td>
<td>Final lab: Final Papers Due, Final Oral Presentations.</td>
</tr>
<tr>
<td>15 (4/26)</td>
<td>Final Creative Projects Due, no lab.</td>
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<tr>
<td>16 (5/3)</td>
<td>Date of Cumulative Final Exam TBD.</td>
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</tbody>
</table>

Policies:
- Please make sure you read over the following policies, as unfamiliarity with them is not a defense for not knowing what they cover.

Course Policies

Class Absences:
- As this is a laboratory course, much of your learning will come from being present in class. Since we will be working together throughout this course, the success of the entire class depends on everyone being present. Therefore, it is important that you make every effort to show up on time to each class, and that you are prepared to stay for the duration of the scheduled class time. It is expected that you will attend every class.
- If you are unable to attend class due to illness or other unforeseen circumstance, please contact me (by email) as soon as possible.

Exam Absences:
- If you must miss an exam due to unforeseen circumstances, please contact me by email as soon as possible.

Final Exam Absence:
- If you must miss the final exam due to unforeseen circumstances, please contact me by email as soon as possible.
- You must also contact the Dean of your college. You will receive an ABS (absent) in the course if you miss the final exam. This ABS will result in an F in the course unless action is taken. The Dean can approve the change of the ABS to an Incomplete, which then allows a limited window of time for you to complete the final exam and earn a grade in the course.
- There will be instances when you must make an individual choice about your ability to perform on an exam and will need to accept any and all consequences for that choice.
- If the absence is a result of a protracted illness, you should follow the procedure for obtaining a letter from the Office of the Dean of Students. The request may be made once the student recovers but not more than 10 business days after the date of absence.
- Information about final exams can be found in the Student Code: http://studentcode.illinois.edu/.

Final Exam Conflict:
- If you find you have a final exam conflict with other courses, please let me know as soon as you can so that necessary arrangements can be made.
MCB Curriculum Policies

For non-academic campus assistance and support:
- See Office of Diversity, Equity and Access (ODEA) information at the end of this document.

Student Advocacy Resources:
- For student-centered advocacy programs and services visit: mcb.illinois.edu/undergrad/advising/resources.

Contacting MCB Course Personnel:
- MCB course personnel are more than happy to assist you.
- Emails to instructors, TAs, or course coordinators will only be answered if they come from an @illinois.edu account. We will only use this account in order to protect your educational information and profile. As a student, please remember that when you email a staff member, it is important to include all pertinent information so that we can assist you in the most efficient and effective manner possible. This information includes:
  - The course rubric in the subject line
  - Your full first and last name
  - Your NetID (the first part of your illinois.edu email account)
  - Your UIN (9 digit number that can be found on your ICard)
  - The course that you are concerned about (the course personnel often work with multiple courses)
  - Your section letter/number
  - The previous email "thread" or previous communicated information pertinent to the situation
- Your cooperation will help us respond much more quickly to your concerns.

Adding the Course after the Semester Starts:
- We understand that the University has an add deadline 10 days into the semester, but the University lets individual courses and/or programs determine their policies for late adds. We feel that students who choose to add a course late do so at their own discretion. We will make every effort to ensure that those who arrive late are caught up with the material to the highest degree possible.

Religious Observances and Practices:
- You are required to submit the Request for Accommodation for Religious Observances Form (which can be found at www.odos.illinois.edu/.../Religious_Observance_Accommodation_Request_Form.docx) to your instructors and the Office of the Dean of Students requesting accommodation by the end of the second week of the course. Requests that are not submitted within this time frame may not be able to be granted. Information about accommodations can be found in the Student Code: http://studentcode.illinois.edu/.
**DRES Accommodations:**
- We are committed to providing a learning environment where our students can succeed. If you require special accommodations, please contact us and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak Street, Champaign, call 217.333.4603, or email disability@illinois.edu. We will try to meet all accommodations once the process has started. Please note that accommodations are not retroactive to the beginning of the semester, but begin the day you contact your professor, instructor or coordinator with a current letter of accommodation from DRES.
- If you believe that you need DRES accommodations, you should contact DRES at disability@illinois.edu.

**Grades:**
- Each course has a grade scale. The grade you earn in the course will be based on the points that you earn. Effort is reflected in points earned. We will adhere to the grade scale when assigning grades in order to avoid capriciousness and to adhere to fairness and equity for all students.

**Academic Integrity:**
- The Code of Policies and Regulations Applying to All Students will be applied in all instances of academic misconduct committed by students. This applies to all exams, presentations, assignments and materials distributed or used in this course. You can review these policies at the following website: http://admin.illinois.edu/policy/code/index.html and specifically here: http://studentcode.illinois.edu/article1/part4/1-401/
- Science cannot exist without honesty. The faculty and staff in MCB require students, as scientists-in-the-making, to hold the highest standards of scientific and academic conduct.
- It is not in your own best interest to cheat, as ultimately you are invalidating your own educational experience. Any form of cheating on any graded work in courses is unacceptable.
- We require that all graded work be entirely your own, and that anything you write using the words of other writers be correctly attributed. Some specific points follow.
- On exams, the answers that your turn in for grading must be your own, formulated during the exam from your own understanding of the material and without any supporting information, be it written, verbal or electronic. Copying the work of another student, or allowing another to copy your work, or copying work from any other source, is unacceptable. If the work you submit resembles that of another student or another source too closely, we may conclude that it was not your original work. Always make a conscious effort to complete your work on your own and to protect it from the view of others, in order to ensure that it will be seen as your own.
- Texting, or the use of a cell phone or any other device for any purpose, during a quiz or exam is prohibited.
- Use of any social or electronic media to share information, request information or make confidential information public is prohibited.
- On written or electronic assignments, the answers that you turn in for grading must be written in your own words, formulated from your own understanding of the material.
While you may be working with other students in the course, you must formulate and submit your own answers. Copying or paraphrasing the work of another student, or allowing another to copy or paraphrase your work, is unacceptable. If the work you submit resembles that of another student too closely, we may conclude that it was not your original work. Always make a conscious effort to complete your work on your own and to protect it from the view of others, in order to ensure that it will be seen as your own. You must also make a conscious effort to protect your passwords and accounts.

- On written or electronic assignments, if you use a statement taken directly from any book or other publication, including the course textbook, you must provide a citation. That is, you must put the text in quotes and put the author of the publication in parentheses after the quotation. Further, using only the words of another author as your entire answer or as the majority of your answer to any question is never sufficient to earn credit. If the majority of your work has been taken directly from a publication, you are likely to receive no credit for the work, since you would not be demonstrating knowledge beyond the ability to copy. Even if you quote another, your answer must be substantially your own words, drawn from your own understanding of the material.

**Electronic Media/Device Use:**
- Use of any social or electronic media to share course information, request course information or make confidential course information public is prohibited.
- Any violation of the social media policy on your account may result in a zero on an assignment or exam or a more extreme penalty at the discretion of the instructor.
- Any social media sites created in relation to MCB courses must grant access to course personnel upon request. Failure to provide access will result in a failing grade in the course for the group/site’s administrator(s).
- No electronic devices, including smart watches, are allowed at exams.

**Course Material:**
- You are welcome and encouraged to make audio recordings of course lectures.
- The material recorded is intellectual and copyrighted property of the University of Illinois Board of Trustees and may be made for personal use only.
- Video recordings of any kind are strictly prohibited.
- Posting of audio recordings or transcriptions on social or electronic media platforms is strictly prohibited.
- Posting or redistributing of course material in any format is strictly prohibited.

**University Information of Student Safety - Active Threats:**
- **General Emergency Response Recommendations** ([Emergency Response Guide](#)):  
- Security Threat. The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: **RUN > HIDE > FIGHT**
• **Only follow these actions if safe to do so.** When in doubt, follow your instincts - you are your best advocate!

• **RUN** — Action taken to leave an area for personal safety.
  - Take the time to learn the different ways to leave your building **before** there is an emergency.
  - Evacuations are mandatory for fire alarms and when directed by authorities! No exceptions!
  - Evacuate immediately. Pull manual fire alarm to prompt a response for others to evacuate.
  - Take critical personal items only (keys, purse, and outerwear) and close doors behind you.
  - Assist those who need help, but carefully consider whether you may put yourself at risk.
  - Look for Exit signs indicating potential egress/escape routes.
  - If you are not able to evacuate, go to an Area of Rescue Assistance, as indicated on the front page of this plan.
  - Evacuate to Evacuation Assembly Area, as indicated on front page of this plan.
  - Remain at Evacuation Assembly Area until additional instructions are given.
  - Alert authorities to those who may need assistance.
  - Do not re-enter building until informed by emergency response personnel that it is safe to return.
  - Active Threat: IF it is safe to do so, run out of the building. Get as far away as possible. Do NOT go to the Evacuation Assembly Area.

• **HIDE** — Action taken to seek immediate shelter indoors when emergency conditions do not warrant or allow evacuation.
  - **Severe Weather:**
    - If you are outside, proceed to the nearest protective building.
    - If sheltering-in-place due to severe weather, proceed to the identified Storm Refuge Area or to the lowest, most interior area of the building away from windows or hazardous equipment or materials.
  - **Active Threat:**
    - Lock or barricade your area.
    - Get to a place where the threat cannot see you.
    - Place cell phones on silent.
    - Do not make any noise.
    - Do not come out until you receive an Illini-Alert advising you it is safe.

• **FIGHT** — Action taken as a last resort to increase your odds of survival.
  - Active Threat: If you cannot run away safely or hide, be prepared to fight with anything available to increase your odds for survival.

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**Student Resources/Where to go for Help:**

We Care at Illinois
- For sexual misconduct support, response and prevention visit: wecare.illinois.edu
Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: [http://oiir.illinois.edu/sites/prod/files/SexualMisconduct_ResourceGuide.pdf](http://oiir.illinois.edu/sites/prod/files/SexualMisconduct_ResourceGuide.pdf)

**Safety and Emergency**

*University Police Department, Emergency, 9-911; Non-emergency, 217-333-8911*

University Fire Department Emergency, 9-911

Crisis Line, 217-359-4141

Emergency Dean, 300 Turner Student Services Bldg., 610 E. John St., 217-333-0050

Counseling Center, 110 Student Services Bldg., 610 E. John St., 217-333-3704

McKinley Health Center, General Information, 217-333-2701

McKinley Mental Health Center, 1109 S. Lincoln, 217-333-2705

Dean of Students, 300 Turner Students Services Bldg., 610 E. John St., 217-333-0050

Local Sexual Assault Center, RACES, 217-384-4444

Women’s Resources Center, 703 South Wright Street, 2nd Floor, 217-333-3137

Rape Crisis 24-hour Hotline, 217-384-4444

Suicide & Psychological Emergency, Suicide Prevention Team, 217-333-3704

SafeRides (free nighttime campus ride program), 217-265-RIDE (265-7433)

SafeWalks (free walking escort service by Student Patrol), 217-333-1216

**Student Services and Advocacy**

Office of the Dean of Students, 300 Student Services Bldg., 610 E. John St., 217-333-0050

**Classroom Support, Teaching Skills, and Instructional Strategies**

Center for Innovation in Teaching & Learning, 249 Armory Building, 217-333-1462

**Counseling Services**

Counseling Center, 110 Student Services Bldg., 610 E. John St., 217-333-3704

McKinley Mental Health Center, 1109 S. Lincoln Ave., 217-333-2701

Psychological Services Center, 3rd Floor, 505 E. Green St., 217-333-0041

**Disability Services**

Disability Resources and Educational Services (DRES), 1207 S. Oak St., 217-333-1970

**Lesbian, Gay, Bisexual, Transgender Resource Center**

LGBT Resource Center, 323 Illini Union, 1401 W. Green St., 217-244-8863

**Veterans Services**

Veteran Student Support Services, Office of the Dean of Students, 610 E. John St., 217-333-0050

Center for Wounded Veterans in Higher Education, 908 W. Nevada St., 217-300-3515

**General Study Skills Assistance**

Office of Minority Student Affairs, 130 Student Services Bldg., 610 E. John St, 217-333-0054

Office of Minority Student Affairs Tutoring Services, 701 S. Gregory Dr., Suite 1, 217-333-7547

Writer’s Workshop, 251 Undergraduate Library, 1402 W. Gregory Dr., 217-333-8796

**Additional academic assistance may be available through individual departments**

**Health Resources**

Health Education, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-2701

Alcohol & Other Drug Office, 2nd Floor Counseling Center, 610 E. John St., 217-333-7557
Sexual Health Educator, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-2714
Dial-A-Nurse, McKinley Health Center (24-hour), 1109 S. Lincoln Ave., 217-333-2700
Health Resource Center, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-6000
Health Resource Center, Room 40 Illini Union, 1401 W. Green St., 217-244-5994
McKinley Health Center, General Information, 1109 S. Lincoln Ave., 217-333-2701

Sexual Harassment/Assault & Acts of Intolerance/Hate Crimes
Office of the Dean of Students, 300 Students Services Bldg., 610 E. John St., 217-333-0050

The Office of Diversity, Equity and Access (ODEA):
  • For non-academic support visit: diversity.illinois.edu
    o Discrimination & Harassment Prevention
    o Title IX
    o Accessibility & Accommodations
    o Inclusive Illinois