KOTHE LAB MANUAL

SUMMER 2019

1. Group philosophy: What it means to be part of the Kothe group

a. Goals

We are working together in the Kothe group because we share a common interest in research and science and because we want to learn and develop our careers with each other. As a team, each person's success and happiness depends to some extent on the others, and we commit to a collaborative approach to achieve our goals.

We recognize the following as important goals that we aspire to achieve together:

- We want to advance our careers and prepare for interesting positions in any science-related field following our time together in the Kothe lab.
- We want to become the best scientists possible.
- We want to make meaningful scientific discoveries that are of general interest to many colleagues.
- We want to disseminate our discoveries through publications and conference presentations.
- We want to ask bold questions that address fundamental and applied issues in the molecular life sciences.
- We want to conduct rigorous and accurate experiments that provide clear insight.
- We want to steadily refine our critical thinking skills through constructive interactions and feedback on research conducted in the Kothe group and by others.
- We want to develop outstanding skills in scientific communication and presentations including using precise and clear scientific language.
- We want to become continuously better at teamwork, time and project management.
- We want to increase our scientific knowledge not only in our own research area to develop a broad knowledge base in the molecular life sciences.
- We want to celebrate each other's successes recognizing that progress of the entire team ultimately benefits each personal career.
- We want to share both successes and challenges because both are needed to make true advances in research and because we want to learn from each other.
- We want to develop strong perseverance by supporting each other.
- We want to enjoy working together.

b. Interacting with each other

Respect & Support

The Kothe team strives to be a role model for professional, respectful and effective teamwork. To achieve this, every team member must actively contribute to the team atmosphere including reminding others about our lab philosophy if needed.

We treat each other with respect recognizing that we all have different skills, different experiences, different backgrounds, different personalities and simply different lives. Respect means for us to strive in our interactions for a good balance of providing support to each other

as well as respecting our privacy. Everybody has different boundaries which we respect, but we also care for each other. We aspire to use honest and respectful language in our direct and indirect interactions, i.e. we are always friendly and polite with each other and we do not talk about each other in a disrespectful manner with others. Our interactions are positive and professional recognizing that successful teamwork must be possible with everybody and is not relying on personal friendship.

In our research, we share advice, lend a helping hand and are patient and understanding with each other. We are open to discuss research projects and experiments with each other, and we actively seek (and provide) advice as needed. We ask and answer questions knowing that each question is worthwhile asking – even more than once. In all our collaboration, we recognize that sharing certain work and helping each other maximizes the efficiency of all our research and work-life balance.

Diversity and Inclusion

Diversity makes a team strong! We rely on each other to contribute different perspectives, ideas and experiences to our team work. Therefore, we strive for equality, diversity and inclusion to continuously improve our team. Diversity has many dimensions for us, and we recognize differences in gender, ethnicity, citizenship, languages, physical and mental abilities, and personalities. Expressing this goal means that we are committed to continuous change in adjusting and improving our working interactions.

The first, but not only principle towards supporting diversity is acting respectfully in our interactions. In particular, we aim to actively listen to each other, be patient, and clarify any potential misunderstandings immediately and directly. Everybody has the right to speak and to be listened to which also means that we take time for meaningful conversations.

Secondly, we strive to be proactive in recognizing, promoting and celebrating diversity as we can greatly learn and benefit from each other. This means that we display an active, genuine interest in each other by asking questions and engaging in meaningful conversations.

We recognize the huge opportunity of the scientific community both within our team as well as with numerous other colleagues (e.g. in the RNA community) to share a common interest and to overcome barriers and biases. It is a privilege to be part of a large scientific community where we can meet many interesting people, and we commit to foster a supportive community and to learn from each other as much as we can.

c. Interacting with others

To avoid group thinking and to truly enrich our experience in the Kothe team, we recognize the utmost importance of fostering strong relationships with other researchers and other research groups. Through respectful, proactive and curious interactions with others, we can significantly expand our horizon and bring new ideas to the Kothe group. Every Kothe team member should strive to enrich our experience and knowledge by interacting with others.

During our interactions with other researchers and groups, we commit to applying the same guidelines of respect as outlined above for inner-group interactions. We recognize that each of us is an ambassador for the Kothe team, and we will therefore share our experience and successes with other researchers.

At the same time, we are mindful of work-in-progress in the Kothe lab that can be confidential, and we will refrain from sharing detailed information on projects in preliminary stages, in particular when interacting with researchers outside the University of Lethbridge.

2. Work-life balance

We commit to enable each group member to achieve a healthy work-life balance! Therein, we recognize that everyone will have a different work-life balance, but our common goal is that each person can lead a healthy life. Furthermore, we recognize that each group member spends a significant time of their life as part of the Kothe group, but we also respect everybody's private lives.

- We support each other in our professional and personal needs and offer advice and support to each other in balancing our work and life commitments.
- When you need one day off on an occasional basis for various reasons (physical or mental health, family issues or other reasons), inform Ute by email that you will be absent. It is your choice whether or not you share the reason for your one-day absence.
- If you are supervising somebody or if you have a supervisor in the lab, inform your supervisor/student by email and copy Ute.
- Plan your holidays in advance with Ute. In general, it is acceptable to take up to one month of holidays balanced over one year to maintain a healthy work-life balance. If you want to take longer holidays, this needs to be discussed with Ute.
- Inform your team members ahead of time if you are absent for more than a week to help coordinating our research. Also, let us know whether or not (and how) you can be contacted during your holidays. We respect each other's holidays and contact a person on holidays only in very important cases.
- Our guiding principle in planning our *working hours* is to maximize both flexibility and productivity. In other words: we spent the time in the lab we need to get the research done. This approach allows us to balance long days/weeks with shorter days/weeks as optimal for both our experiments and our work-life balance.
- Whereas you are in general flexible in choosing your work hours, we commit to be present between 10 am and 3 pm for most of the time (e.g. except for lunch) to enable coordination and interaction among all group members. You may work in the wet lab(s) or the office as needed during this time.
- You are encouraged to enjoy your time in the Kothe team and the University of Lethbridge as much as possible engaging in healthy social relationships! However, be aware that mere presence and social interactions do not count towards research work.
- Independent study and honor thesis students should use the weekly office hours with Ute and their supervisor to plan the up-coming week and to get advice on managing their time. In general, the University of Lethbridge expects independent study students to invest 10 hours per week into the independent study. This time can be flexibly arranged across different weeks, i.e. it is likely that you will work more in certain weeks, but you are then able to invest less time in other weeks, e.g. when you have other obligations, midterms, etc.
- Graduate students prepare a research proposal including timeline at the onset of their studies which is a very useful tool to monitor your progress over time. Conducting graduate studies furthers your education and cumulates in an advanced degree based on your scientific achievements, but not based on your hours spent at the University. Therefore, you should be smart about planning your experiments as well as your time! Ute is available anytime for advice and feedback on your progress and time commitment, and it is recommended that you discuss your goals and achievements with her every term.

3. Scholarship and reference letter

Scholarships and Fellowships enhance your career by boosting your CV, provide you with more money and help our lab to host more students. Therefore, we should use every reasonable opportunity to apply for these! Ute will always support each team member with a strong reference letter. Here are a few areas of advice to prepare a strong application:

- Be aware of available funding opportunities and deadlines, e.g. through the SGS newsletter! Important opportunities for us are the internal fellowships as well as Alberta Innovates support and NSERC.
- Start the application at least four weeks before the deadline.
- Ask early and politely for reference letters – several weeks in advance! Think about who knows you best and can speak to your research skills, e.g. your committee members or collaborators. Ensure that they have regularly and positively interacted with you and observed you participating actively in seminars and presentations.
- Ute needs two weeks of notice to write a strong reference letter which takes her 1-2 hours. Adjusting a recently submitted reference letter takes her only 30 min.
- Write your research proposal early to allow enough time to polish it together with Ute as it takes at least two to three weeks to write an outstanding proposal.
- Ask other lab members to read your research proposal or scholarship application as they may have experience and a fresh outside perspective. More feedback is always better!

4. Conferences & Workshops

Attending conferences or workshops is one of the great privileges of being a scientist! You will gain fresh ideas and suggestions for your own research, and you will meet new collaborators and interesting researchers. It is also motivating to experience how others are interested in our research and to represent the Kothe team in the wider research community. Workshops can represent an efficient way to learn a new experimental technique that is not yet applied at the University of Lethbridge / ARRTI.

But, conferences are expensive! Therefore, each team member should seek opportunities to obtain travel funding, e.g. for graduate students through the School of Graduate Studies (SGS), the Graduate Student Association (GSA), for undergraduates through the Dean of Arts & Science and Research Services or for anybody through conference-specific travel awards. For regional conferences like RiboWest, we can also maximize participation by keeping travel and accommodation costs low (thanks for your flexibility!).

If you have excellent data that are getting ready for a publication, you may ask Ute for support to attend a conference and to impress the scientific community with your story.
Interesting conferences in our field:

- international RNA Society Meeting
- Ribowest
- international tRNA meeting (every second year)
- Alberta Epigenetics Network
- Gordon Research Conference on RNA Editing (every second year)
- RiboClub Conference (Sherbrook)
- Biophysical Society meeting (international and Canadian)
- Protein Function Structure and Malfunction (PFSaM) (every year in Saskatoon)

- Canadian Society of Chemistry Meeting
- CSMB Meeting (Canadian Society of Molecular Biology)

5. Publications

As stated in our goals, we strive to generate high-quality interesting publications that gather the attention of our international colleagues. A peer-reviewed publication is the gold standard of scientific research, but it takes many steps to achieve a publication:

- Generate a high-quality, reproducible data set and discuss with Ute the "story" emerging from the data, i.e. the main novel insight into RNA biology. This can be initiated early and repeatedly, and it can also be helpful to draw a schematic model of the take-home message for the publication. Ideally, you should come with a "story" in mind which can be further refined ty talking with Ute.
- Decide what additional data are needed to complete the story for publication and to make it as interesting as possible.
- Discuss and decide on a journal (and alternatives) for publication based on similar publications by other colleagues in our field considering scope and impact of your work. Publication cost can also play a role.
- Read the submission guidelines for authors of this journal carefully.
- Prepare high-quality figures that are clearly organized and follow the journal's guidelines. Write the figure legends.
- Use our "How to write a Paper" guideline document to write a first draft of the manuscript, typically in the order of materials & methods, results, discussion, introduction, abstract. Again, follow the journal guidelines.
- Improve and polish the manuscript through rounds of revisions with Ute and possibly other colleagues (from our or other labs, e.g. find someone who is specialized in the technique you are using).
- Write and improve a strong cover letter highlighting the impact of this manuscript in the broader (RNA) research community.
- Submit the manuscript and hope that the editor sends it to reviewers.
- Prepare more biomolecules, conduct more experiments in anticipation of the reviewers' requests which typically need to be addressed in limited time.

An important consideration when publishing is authorship. In general, any researcher who has made substantial intellectual and/or experimental contributions to the work will become a co-author. Experimental contribution means that you have generated at least one figure in the manuscript. Students who helped with preparative work (proteins, RNA, cloning, mutagenesis, etc.) are typically recognized in the acknowledgements. Intellectual contribution means development of ideas, data analysis and/or writing of the manuscript. In our field, the order of the authors reflects the magnitude of the contribution with the first author having conducted most of the work.

6. Intellectual Property

Successful research depends on interesting ideas and high-quality experiments. The outcome of research is typically either a publication (with associated copyright) or a patent; both copyright and patent fall under the topic of intellectual property. To familiarize yourself with intellectual property, you should read the UofL "Intellectual Property Guidelines for Graduate

Students and Supervisors" and discuss any questions with Ute.

Most of our research is supported by federal and provincial funding agencies (NSERC, Alberta Innovates etc.) which do not impose intellectual property restrictions. As a graduate student working in our collaborative team, any intellectual property typically remains with Ute as the principal investigator and you as the student depending on whether you made a substantive intellectual contribution. Note that for employees of the UofL such as research associates/technicians, the intellectual property is owned by the employer.

Each team member must complete a "Intellectual Property Discussion Form" together with Ute.

7. Research, safety and intellectual training

In general, it is your responsibility to arrange for the suitable training including instrument training such that you know how to correctly and safely carry out your research. In particular, you have to read and understand every instrument SOP before using a particular istrument. In doubt, ask for advice and training! Specifically, you will need to complete the following training and fill the corresponding forms before working in the Kothe lab:

- WHMIS training
- Cryogen training
- Campus Safety form
- Lab employee training (& form)
- Read, understand and sign the Hazard Assessment for our labs
- Intellectual Property Awareness form (read Intellectual Property Guidelines)
- Centrifuge training
- Chromatography training
- Fluorescence spectrometer training
- Radiation training (before working with radioactive materials)
- Laser training (before working with laser)

In addition to safety and research training, it is your responsibility to benefit as much as possible from the intellectual training environment provided in the Kothe group and in the Alberta RNA Research and Training Institute (ARRTI). Effective intellectual training can only be achieved by your active involvement! Therefore, it is your obligation to attend all lab meetings and journal clubs (occurring weekly) and the monthly RiboClub videoconferences, and you also must actively participate by asking meaningful questions to refine your skills in critical thinking and questioning. As much as possible, you should also attend ARRTI Speaker and Seminar events, other guest speaker lectures. as well as theses defenses.

To improve your skills in scientific writing and citing literature, you are strongly encouraged to participate in an Endnote workshop offered by the library. Similarly, Adobe Illustrator workshops can teach you useful skills in preparing high-quality figures. Also, you need to teach yourself (or ask others) how to use the Prism software to generate scientific graphs.

8. Record keeping

- All data must always be stored on the shared Kothe-research-drive.
- Write your lab book daily following the Kothe lab guidelines.
- Label all gels appropriately both in your lab book and in the electronic file with the

following information: date, type of gel, sample description for each lane including quantities loaded. For western blot, add the antibody name and dilution and the exposure time).
- Label your samples clearly, ideally with initials and date to refer clearly to your lab book where additional information can be maintained.
- Enter all samples for long-term storage in Quartzy in particular if these are stored at -80°C, i.e. glycerol stocks with plasmids/strains verified by sequencing, plasmid stocks verified by sequencing, protein preparations, antibodies, primer stocks (100 μM).
- New chemicals must be entered in Chematix with a barcode and location. Empty chemicals must be removed from Chematix.
- When working with radioactive materials, complete the documentation within 24 hours and ensure it is 100% correct (if needed, ask for help and double-checking) because we may otherwise loose the radiation license for the entire lab.

9. Lab safety and maintenance

To achieve our goals, we must maintain a safe and functional lab where each team member has access to all the required materials and instruments. The following list of rules is not exhaustive, but covers many basic aspects of maintaining a safe and functional lab:

- Under no circumstances are you ever allowed to handle any scientific sample outside the designated lab space!
  The only reason to bring a sample outside the lab is to transport it to another lab such as the instrument cluster. In this case, the sample must be in a closed safe container and double-contained, i.e. a closed bottle or tube within a plastic box. The sample cannot be opened unless you are in a designated lab.
- We need to help each other as a team to maintain highest safety standards. Thus, you have not only the responsibility to follow safety rules yourself, but you also need to observe and remind other team members to do so. If you have doubt or disagreement on how to apply a safety rule, it is your responsibility to proactively seek advice from a qualified person, i.e. not another team member, but an experienced faculty member.
- No food and no drinks are allowed in the lab.
- Do not store personal property in the lab (no backpacks, coats, etc.).
- You must wear appropriate clothing at work, i.e. closed shoes and long pants to protect your feet and legs (no flip flops, shorts, skirts).
- You must always wear a lab coat and gloves when working in the lab, and you need to know when safety glasses or other Personal Protective Equipment (PPE) is needed.
- Long hair must be tied into a ponytail or similar in the lab to minimize contamination with hear.
- No headphones on both ears (only one). You must be able to hear the others talking and be able to hear an abnormal sound coming from an instrument.
- Wash your hands when you leave the lab.
- Follow the common Kothe lab protocols and suggests improvements as you see fit.
- Never wear gloves when using the computer.
- Only one glove is allowed outside the lab area; open doors without gloves.
- Talk with a principle investigator if there was an incident and file a report together.
- At the end of every day, remove clutter from your bench and clean it with 70% ethanol. In general, don’t leave your materials/gloves in other lab areas.

- Always clean the balance with a wet paper towel after each use. Also, remove spills immediately.
- Fill your own tip boxes using gloves, label them with your name and bring them to the autoclaving area.
- Know and complete your lab tasks in a timely manner such as dishwashing, mopping, preparing buffers/media etc.
- Read instrument SOPs and familiarize yourself with new equipment before using it.
- Use our booking systems to reserve equipment for the time you actually need it; remove/adjust booking if your time changes. Respect other bookings.
- Turn off equipment after you used it to increase its lifetime. Similarly, check if all instruments are turned off if you are one of the last researchers in the lab in the evening.
- When materials get low, report it on the board for shared materials or in the Kothe ordering book for lab-specific materials. In doubt and in urgent cases, communicate with our research assistant Emily Soon.
- The ethidium bromide stain and the spatula must stay in the staining area.
- Microbial growth plates in the fridge must be wrapped with parafilm and can be kept for max 3 months in the fridge. Wrap with parafilm them before throwing them away.
- Don’t leave a liquid culture in the fridge longer than 12 hours. If you want to keep the culture, spin it down and freeze it.
- When you borrow something, give it back as fast as possible to the same person.
- *If you break something, you must make up for it by brining cake to lab meeting.*

Name (printed)	Signature	Date
Julia GUEGUENIAT		August 01, 2019.
Daniel Rocca		Aug 1 2019
Emily Soon		Aug 1, 2019
Jeffrey McDonald		Aug 1, 2019.
Dennis Campbell		Aug 1, 2019
Dominic Czekay		Aug 1, 2019
Damian ha Rosa M.		Aug 1, 2019.
Gayatri Devi		Aug 1, 2019
Michelle Wu		Aug 1, 2019
Hope Vienneau		Aug 1, 2019.
Ute Kothe		Aug 1, 2019
Elijah Dueck		Aug 1st, 2019.
Sarah Schultz		Aug 1/19
Timothy Vos		Aug 1/19