March 16, 2016

Prof. Peter Englezos
Chair
Department of Chemical and Biological Engineering
University of British Columbia
2360 East Mall, Vancouver, BC, V6T 1Z3, Canada

Dear Prof. Englezos,

I am writing to express my interest in the tenure-track instructor position in the Department of Chemical and Biological Engineering at the University of British Columbia. I will be graduating in May from my doctoral studies in chemical engineering at McGill University with a focus on Gas Hydrates. I believe I'm an exceptional candidate for the job due to my pedagogical, research, and leadership experience.

I am a passionate educator and have held a variety of teaching positions both inside and outside the classroom. My teaching roles include experiences as a teaching assistant, guest lecturer and teaching fellow. In all of these roles I have developed and implemented programs to improve learning and teaching. These experiences have resulted in a number of publications and recognition from the University community. Throughout my studies I also served on multiple academic committees related to teaching. Learning experiences with great teachers throughout my life motivate me to continue contributing to education.

During my time at McGill I was given autonomy to plan and execute research programs. This independent approach, under the supervision of Dr. Phillip Servio, trained me to create and manage projects with partners across a variety of disciplines. I developed international collaborations and mentored multiple students in the laboratory. These experiences have built my communication and team management skills. I hope to pursue research and supervision at the University of British Columbia.

Enclosed are my curriculum vitae, teaching dossier and references. I look forward to continuing the conversation about the opportunity by phone at +1-514-501-5506 or by email at jonathan.verrett@mail.mcgill.ca.

Sincerely,

Jonathan Verrett

JONATHAN VERRETT

jonathan.verrett@mail.mcgill.ca

McGill Department of Chemical Engineering
Room 3060, 3610 University Street
Montreal QC H3A0C5 CANADA

102-1161 Rue Panet
Montreal QC H2L2Y6 CANADA
514-501-5506

EDUCATION

PhD of Engineering: Chemical Engineering 2011-2016
McGill University, Montreal, QC

- Thesis: Promotion mechanisms for gas hydrate growth
- Supervisor: Dr. Phillip Servio
- CGPA 4.00/4.00

Bachelor of Engineering: Chemical Engineering, Environmental Engineering 2011
McGill University, Montreal, QC

- CGPA: 3.94/4.00

RESEARCH

EXPERIENCE

Doctoral Researcher 2011-2016
Department of Chemical Engineering, McGill University

- Planned and managed a 5-year experimental and modeling study on gas hydrate promotion mechanisms
- Supervised 4 summer students and 1 visiting master's student
- Published 5 research papers and presented at 2 international conferences

Transatlantic Partnership for Excellence in Engineering Exchange Dec 2013-June 2014
Department of Chemistry, University of Paris South (Paris XI)

- Designed, built and tested a controlled atmosphere chamber for analyzing charge carrier dynamics in photocatalytic materials
- Contributed to 1 paper and 3 conference presentations

Undergraduate Student Researcher (Hydrates) May-Aug 2010
Department of Chemical Engineering, McGill University

- Designed a new experimental setup to characterize heat transfer during hydrate growth while examining the effects of promoting and inhibitory compounds

Undergraduate Student Researcher (Biohydrogen) May-Aug 2009
Department of Chemical Engineering, McGill University

- Coordinated experiments to increase efficiency of hydrogen producing bacteria
- Won the poster competition for undergraduate summer researchers

SELECTED PEER REVIEW PUBLICATIONS

1. **Verrett, J.,** & Servio, P. (2016). Reaction rate constant of CO2—tetra-n-butylammounium bromide semi-clathrate formation. *Canadian Journal of Chemical Engineering* (under review).

2. **Verrett, J.,** Renault-Crispo, J. S., & Servio, P. (2015). Phase equilibria, solubility and modeling study of CO2/CH4+tetra-n-butylammonium bromide aqueous semi-clathrate systems. *Fluid Phase Equilibria, 388*, 160-168.

3. Posteraro, D., **Verrett, J**., Maric, M., & Servio, P. (2015). New insights into the effect of polyvinylpyrrolidone (PVP) concentration on methane hydrate growth. 1. Growth rate. *Chemical Engineering Science, 126*, 99-105.

4. Wei, Z., Kowalska, E. K., **Verrett, J.**, Colbeau, C., Remita, H., & Ohtani, B. (2015). Morphology-dependent photocatalytic activity of octahedral anatase particles prepared by ultrasonication–hydrothermal reaction of titanates. *Nanoscale*, 7, 12392-12404.

5. Verrett, J., Kietzig, A.-M., & Orjuela-Laverde, M. (2015). I flipped my tutorials: a case study of implementing active learning strategies in engineering. *Proceedings of the CEEA 2015 6th Annual Conference, Hamilton, Canada.*

6. Jitrwung, R., **Verrett, J.,** & Yargeau, V. (2013). Optimization of selected salts concentration for improved biohydrogen production from biodiesel-based glycerol using Enterobacter aerogenes. *Renewable Energy, 50*(0), 222-226

7. **Verrett, J.,** & Servio, P. (2012). Evaluating surfactants and their effect on methane mole fraction during hydrate growth. *Industrial and Engineering Chemistry Research, 51*(40), 13144-13149.

8. **Verrett, J.,** Posteraro, D., & Servio, P. (2012). Surfactant effects on methane solubility and mole fraction during hydrate growth. *Chemical Engineering Science, 84*, 80-84.

SELECTED CONFERENCE PRESENTATIONS

I. **Verrett, J.**, & Servio, P. (2015). Kinetics of carbon dioxide capture using tetrabutylammonium bromide semi-clathrates. *Paper presented at the 65th Canadian Chemical Engineering Conference, CSChE2015, Calgary, Alberta.*

II. **Verrett, J.**, & Orjuela-Laverde, M. (2015). I flipped my tutorials: A case study of implementing active teaching strategies. *Paper presented at the 35th Annual Conference of the Society for Teaching and Learning in Higher Education (STLHE), Vancouver, Canada.*

III. **Verrett, J.,** Posteraro, D., Ivall, J., Brennan, S., & Servio, P. (2014). Understanding the Effect of Kinetic Additives on Gas Hydrate Growth. *Paper presented at the 8th International Conference on Gas Hydrates (ICGH8-2014), Beijing, China.*

IV. Alajek, S., Ham, A., Heather, M., & **Verrett, J.** (2013). Blurring the line between for-credit curricular and not-for-credit extracurricular engineering learning environments. *Paper presented at the Canadian Engineering Education Association Annual Conference (CEEA 2013), Montreal, Canada.*

V. **Verrett, J.** (2013). The Role of Peer-to-Peer Learning in Improving Pedagogical Skills of Teaching Assistants. *Paper presented at the Canadian Engineering Education Association Annual Conference (CEEA 2013), Montreal, Canada.*

HONOURS AND AWARDS

Faculty of Engineering Outstanding Teaching Assistant Award 2015
- For effective tutorials and the creation of an online video solution repository

Transatlantic Partnership for Excellence in Engineering Award Dec 2013-June 2014
- 9,000€ over 6 months, 3 awarded of 3 applicants

National Sciences and Engineering Research Council (NSERC)
Doctoral Canada Graduate Scholarship 2013-2016
- $105,000 over 3 years, 261 awarded of 1600 applicants

McGill Engineering Doctoral Award 2011-2014
- $72,000 over 3 years

NSERC Master's Canada Graduate Scholarship 2011-2012
- $17,500 over 1 year, 774 awarded of 1640 applicants

British Society Medal – Top student in chemical engineering 2011

Society of Chemical Industry Merit Award – Top student in chemical engineering 2011

Dean's Honour List – Top 10% of students in the faculty 2011

Order of Engineers of Quebec (OIQ) Merit Award – 2nd place 2011
- $5,000, awarded for outstanding academic and extra-curricular contributions

NSERC Undergraduate Student Research Award 2009 & 2010

ASSOCIATIONS

Member of the Canadian Engineering Education Association 2013-present

Member of the Society of Chemical Industry 2011-present

Member of the Canadian Society of Chemical Engineering 2008-present

TEACHING EXPERIENCE

Graduate Teaching Fellow 2011-2016
Tomlinson Project in Undergraduate Level Science Education, McGill University
- Lead Fellow (2014-onwards) organizing the group of 8 graduate students
- Organized and facilitated four 2-day graduate teaching workshops per year
- Designed and ran workshops for university partners such as Teaching and Learning Services and the Physics Department
- Published and presented on pedagogy development at McGill

Teaching Assistant Fall 2015
Course: CHEE 687 – Research Skills and Ethics, McGill University
- Created and marked assessments for this new graduate-level course
- Organized and delivered one guest lecture on integrity and ethical conduct

Teaching Assistant Fall 2015
Course: FACC 100 – Introduction to the Engineering Profession, McGill University
- Facilitated class activities such as student presentations and design challenges
- Graded writing assignments and responded to student questions

Research Assistant Winter and Fall 2014
Teaching Enhancement Initiative, Faculty of Engineering, McGill University
- Developing and led workshops on effective teaching practices
- Assisted faculty and students to implement pedagogical changes

Teaching Assistant Fall 2012, 2013 & 2014
Course: CHEE 423 – Chemical Reactions Engineering, McGill University
- Led interactive weekly tutorials and created online quizzes
- Recorded long-answer problem videos and created an online repository
- Held weekly office hours, graded weekly quizzes and provided feedback

Teaching Assistant Winter 2012 & 2013
Course: CHEE 315 – Heat and Mass Transfer, McGill University
- Organized TAs for laboratory experiments, ran laboratories and graded reports
- Led weekly problem solving tutorials and held one guest lecture each term
- Held weekly office hours, graded midterm exams and provided feedback

SERVICE EXPERIENCE

Graduate Representative 2013-2016
Committee on Teaching and Learning, Faculty of Engineering, McGill University
- Represented graduate students and created policies on faculty-wide teaching

Graduate Representative 2013-2016
Academic Committee, Faculty of Engineering, McGill University
- Represented graduate students and recommended curricular program changes

Engineers Without Borders (EWB) Canada 2009-2015
National Conference Delegate Experience Team (2014-2015)
- Updated website and coordinating social events for roughly 800 delegates

National Curriculum Enhancement Team (2012-2014)
- Coordinated national strategy and contact with Quebec chapters
- Created and led training program on curriculum change in higher education

McGill Chapter President (2010-2011)
- Managed a team of 15 executives and 100 volunteers and coordinated their leadership development
- Fundraised $35,000, reached 5,400 students on campus and 950 middle school students through presentations about diverse engineering issues

McGill Chapter V-P Fundraising (2009-2010)
- Co-managed a team of 10 and raised $30,000

McGill Chemical Engineering Graduate Student Society 2011-2013
President (June 2013-December 2013)
- Organized social events and responses to academic policy with a council of 12 representing roughly 100 graduate students in the department

V-P Admin (2012-2013)
Post-Graduate Student Society Representative (2011-2012)

LANGUAGES

Fluent in French and English (written and spoken)

INTERESTS

17 years bagpiping and member of the Royal Canadian Mounted Police Pipe Band
15 years skiing and previously a certified bilingual ski instructor
7 years brewing experience ranging from extract kits, to all grain and cider

Teaching Dossier

Jonathan Verrett, PhD.

Department of Chemical Engineering

McGill University

March 2016

Table of Contents

Teaching Responsibilities

Teaching Experiences

Below is a list of courses (in order of relevance) in which I have taught, including my role, a brief course description, teaching duties and dates that I was involved. The first two entries are courses which include a laboratory component.

CHEE 315 – Heat and Mass Transfer, McGill University, with Prof. Phillip Servio
Role: Teaching Assistant –labs, tutorials and grading
Description: Transport of heat and mass by diffusion and convection; transport of heat by radiation; diffusion; convective mass transfer; drying; absorption; mathematical formulation of problems and equipment design for heat and mass transfer; laboratory exercises.
Duties:

- Organized TAs for laboratory experiments, ran laboratories and graded reports
- Led weekly problem solving tutorials and held one guest lecture each term
- Held weekly office hours, graded midterm exams and provided mentoring and feedback

Dates: Winter 2012 & 2013

CHEE 423 – Chemical Reactions Engineering, McGill University, with Prof. Anne Kietzig
Role: Teaching Assistant – lab development, tutorials and grading
Description: Review of fundamental concepts in chemical reaction thermodynamics and kinetics. Mass and energy balances for homogenous ideal reactors. Batch, semi-batch and continuous operation. Minimization of by-product and pollution production. Heterogenous reactions, effect of heat and mass transfer on the global rate. Laboratory exercises.
Duties:

- Developed a new laboratory experiment on reaction heat effects.
- Led interactive weekly tutorials and created online quizzes
- Recorded long-answer problem videos and created an online repository
- Held weekly office hours, graded weekly quizzes and provided feedback

Dates: Fall 2012, 2013 & 2014

CHEE 687 – Research Skills and Ethics, McGill University, with Prof. Nathalie Tufenkji
Role: Teaching Assistant – assessment and content creation
Description: The course provides a foundation in three areas: (i) integrity and ethical conduct, (ii) knowledge dissemination and translation, and (iii) research management. Ethical considerations in situations involving conflict of interest, authorship, and intellectual property attributions are discussed. Students will gain experience in identifying and selecting key information for different situations. Best practices in data reporting, maintenance of research notebooks and legal aspects of data ownership and rights are discussed.
Duties:

- Created and marked assessments for this new graduate-level course
- Organized and delivered one guest lecture on integrity and ethical conduct

Dates: Fall 2015

FACC 100 – Introduction to the Engineering Profession, McGill University, with Prof. Lawrence Chen
Role: Teaching Assistant – classroom activities facilitation and grading
Description: Introduction to engineering practice; rights and code of conduct for students; professional conduct and ethics; engineer's duty to society and the environment; sustainable development; occupational health and safety; overview of the engineering disciplines taught at McGill.
Duties:

- Facilitated class activities such as student presentations and design challenges
- Graded writing assignments and responded to student questions

Dates: Fall 2015

Supervision

Below is a list of students (in chronological order) in the gas hydrate laboratory at McGill I have directly supervised, including their name, role, a description of their project and active dates in the laboratory.

Marion Offenstein
Role: Diploma student on internship from the Institut Universitaire de Technology – Orsay, France
Description: Marion's exchange arose out of my own exchange to the Université de Paris-Sud and my relationship with my supervisor, Prof. Christophe Colbeau-Justin, who taught at the Institut Universitaire de Technology – Orsay. I was responsible for developing a project for Marion to work on and supervising her work during her stay. The internship contributed to finishing her degree and included a written report and presentation.
Dates: June to August 2015

Philippe Assaad
Role: Undergraduate student researcher
Description: Philippe took a term in our lab to earn course credits for research. He worked with me on experiments related to my thesis. I was responsible for his supervision and development in the lab including the presentation of a final report.
Dates: January to April 2015

Makoto Mitarai
Role: Master's student on exchange from Keio University, Japan
Description: I was responsible for helping Makoto develop and accomplish a research project. I advised and helped in planning, building and executing experiments. The work contributed to his Master's thesis.
Dates: November 2012 to December 2013

William Chen
Role: Undergraduate student researcher
Description: Will received an Undergraduate Summer Research Award from the National Sciences and Engineering Research Council (NSERC). I was responsible for developing a project for Will and supervising his work. Will presented the project at a poster session at McGill and also stayed following the summer to earn course credits for research.
Dates: May 2012 to December 2013

Spencer Brennan
Role: Undergraduate student researcher
Description: Spencer received an Undergraduate Summer Research Award from NSERC. I supervised Spencer, who worked with me on experiments related to my thesis. He presented the work at a poster session at McGill and also stayed following the summer to earn course credits for research.
Dates: May 2011 to December 2012

Teaching Approach

Teaching Philosophy

In my classroom I seek to inspire students to become independent learners and continually grow their knowledge and skills. Creating life-long learners is no easy process and requires effort on the part of the student and the professor. To make this successful, students must feel they have ownership over the course and material. In my teaching I strive to be well organized and engage the learner in the teaching process. To achieve this, I focus on dialogue, transparency and peer learning inside and outside the classroom.

I seek to make my class an open and inclusive learning environment for all students. During my time as a Teaching Assistant running tutorials I started discussions on teaching and provided students with multiple avenues to give feedback. Comments would come in the form of face to face discussion in class or during office hours, emails, posts to the course message boards or anonymous messages. Throughout the years, I received many helpful suggestions to improve both my classroom strategy and content, however I think the far more valuable contribution was the buy-in from students feeling that they were active stakeholders in their education. In the future, I look forward to continuing to support students as active partners in their education.

To keep students engaged in the course I try to be as transparent as possible with assessment activities. Since assessments direct what students focus on in their learning, I believe it is important to be clear about assessment tasks and promote practice with low-stakes tasks. For lab assignments, or written projects, I always have a rubric to hand out to students to let them know what is expected and how they will be graded. I have found that with these tools students can generally grade themselves, and also have a better understanding of their grade and how they can improve. These practices foster skills of reflection and self-assessment to create independent learners.

One of the most powerful techniques that I try to implement throughout my teaching practice is peer learning. I believe that in the classroom everyone can be an instructor and that individual attention, whether by peers or the professor, will lead to better content matter understanding and learning practices. Given that many universities see larger and larger class sizes; techniques such as think-pair-share or group discussion help to engage all students in the classrooms. This environment also encourages students to collaborate outside of the classroom environment where much learning also occurs. This not only increases skills in the course content, but also builds transferrable skills in teamwork, communication and critical thinking that can be used for life-long learning.

In my previous teaching experiences, I have built a variety of skills and contributed to literature on education at Universities. Looking forward, I wish to continue to grow and reflect on pedagogy with my colleagues. I also hope to promote dialogue on teaching and learning with all stakeholders involved, be they professors, students, teaching assistants, support staff, or alumni.

Teaching Interests

Given my background with both undergraduate and graduate degrees in chemical engineering, I am comfortable teaching a wide variety of courses in the field. Below is a non-exhaustive list of subjects that I am comfortable teaching along with relevant courses from the University of British Columbia curriculum. My research background is in energy systems and I would be pleased to develop and teach technical electives in this area.

Laboratory Courses - CHBE 262, 362, 364, 366, 464
Reaction engineering – CHBE 455, 550
Transport phenomena and thermodynamics – CHBE 251, 346, 351, 551, 554, 557
Numerical Methods – CHBE 230, 552, 553
Introductory/Other courses – CHBE 201, 241, 243, 48, 487, 583

During my PhD, I was involved in many teaching initiatives at McGill. One opportunity, which lasted throughout my PhD, was my role as a Tomlinson Teaching Fellow. The training for my position as a fellow included taking a course listed on my graduate transcript entitled Teaching and Learning in Higher Education (course code EDPH 689). The course aimed to give instructors the tools to successfully plan and teach in a University environment. As part of the course, I developed a comprehensive teaching plan for a chemical thermodynamics course for second-year undergraduate students. This teaching plan included:

- Selecting and organizing relevant course content,
- Generating a course outline and learning outcomes,
- Developing strategies to assess student learning including the creation of sample assessments and evaluation rubrics for a paper test as well as a laboratory exercise.
- Executing two small lessons known as microteachings, which were 10 minute recorded interactive exercises to explain a concept to the class. Reflection on teaching techniques was done using classroom recordings and student feedback.

I learned an immense amount in the course and continued building on my teaching and learning skills throughout my graduate career at McGill. I was awarded an outstanding teaching assistant award for my work in reactions engineering (CHEE 423) modifying tutorials and building online resources for students. I have guest lectured, led tutorials and organized lab sessions in a heat and mass transfer course (CHEE 315). I helped develop and implement a new graduate course in the department on research skills and ethics (CHEE 687). In my five years working as a teaching fellow I have organized and delivered teaching workshops that have reached hundreds of students. All these experiences have made me very confident in planning and leading laboratory and classroom activities, skills I hope to bring to the position at the University of British Columbia.

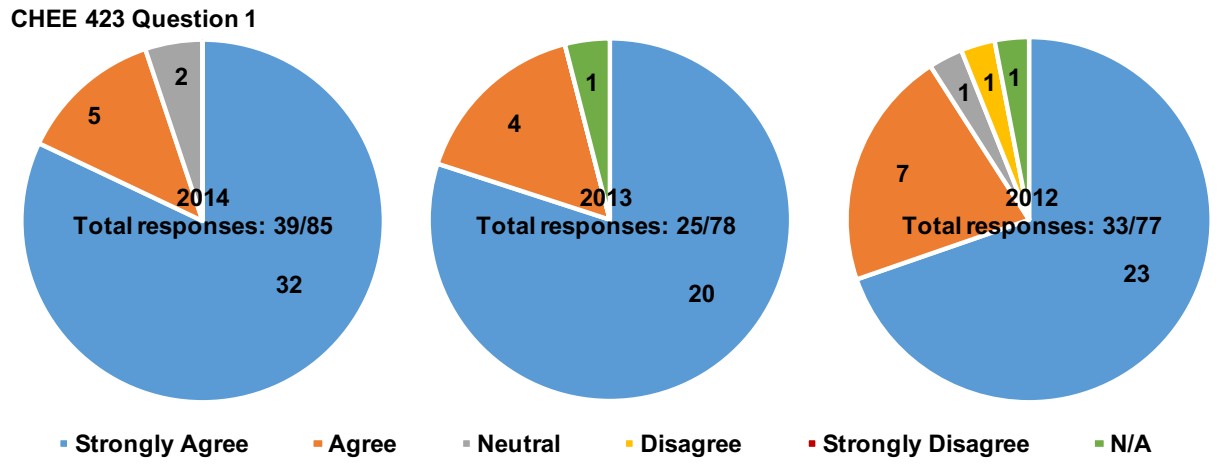
Evidence of Teaching Effectiveness

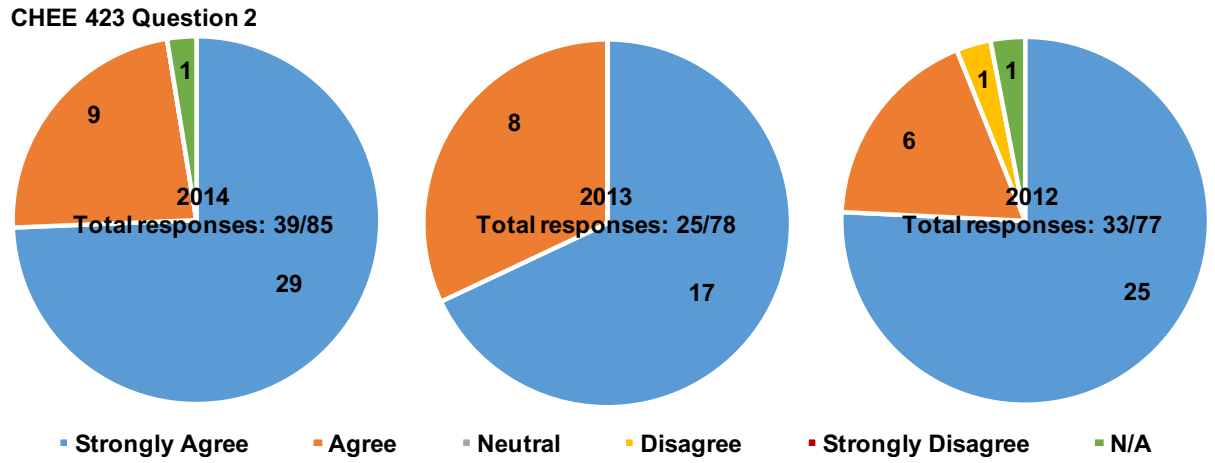
Student Evaluations

Below are summaries of formal student evaluations provided following the courses I have taught. In these evaluations, two Likert scale questions are asked to students and a space is then provided for any additional comments. The Likert questions asked are: 1) "The T.A. was available for consultation and provided feedback in a timely manner (e.g., during course-scheduled activities, office hours, email, etc.)" and 2) "The T.A. helped me understand the course material (e.g., through tutorials, lab sessions, grading, discussions, etc.)". With possible responses being "strongly agree", "agree", "neutral", "disagree", "strongly disagree" and "N/A". Comments were prompted by the question: "Please provide any constructive comments on the overall effectiveness of the TA".

CHEE 423 – Chemical Reactions Engineering

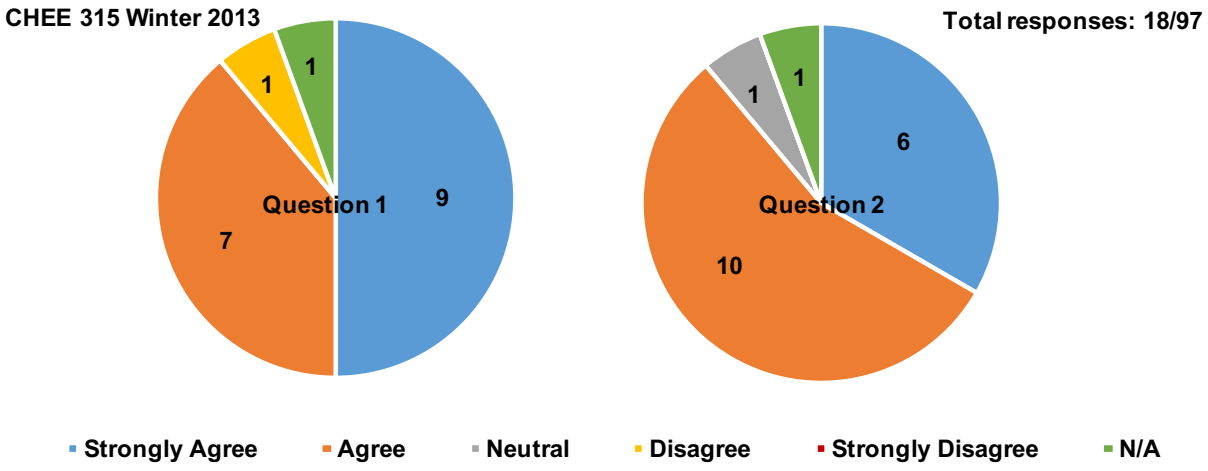
I was a teaching assistant leading tutorials in this course over 3 years. Student responses to both Likert questions are very positive, similar from year to year and can be found below. I attribute this to my organization and focus on student understanding, demonstrated by student comments - "Jon is a good T.A., he came prepared to tutorial and didn't just solve problems on the board but helped us understand what we are doing in the tutorial." I strive to be available outside of class and promptly respond student needs - "Jonathan is definitely one of the best TAs in Chemical Engineering. He always puts in the effort to give effective tutorials. In addition, he's always available to answer questions, both in his office and by email, and he definitely knows his stuff. It's always a pleasure having him as a TA; his efforts are much appreciated.". During my time as a TA I helped make fundamental changes to the course and introduced long-answer videos solutions which solved sample exam questions. This shifted content outside the tutorial allowing more time to facilitate discussion and interaction in the tutorial - "Tutorials and long answer videos were excellent. Very informative and well structured, greatly aid in understanding the tough material." I was glad to be able to share my passion for teaching with the students - "He should teach as much as possible. This TA is made to be a professor. He is extremely constructive and helpful and approachable."





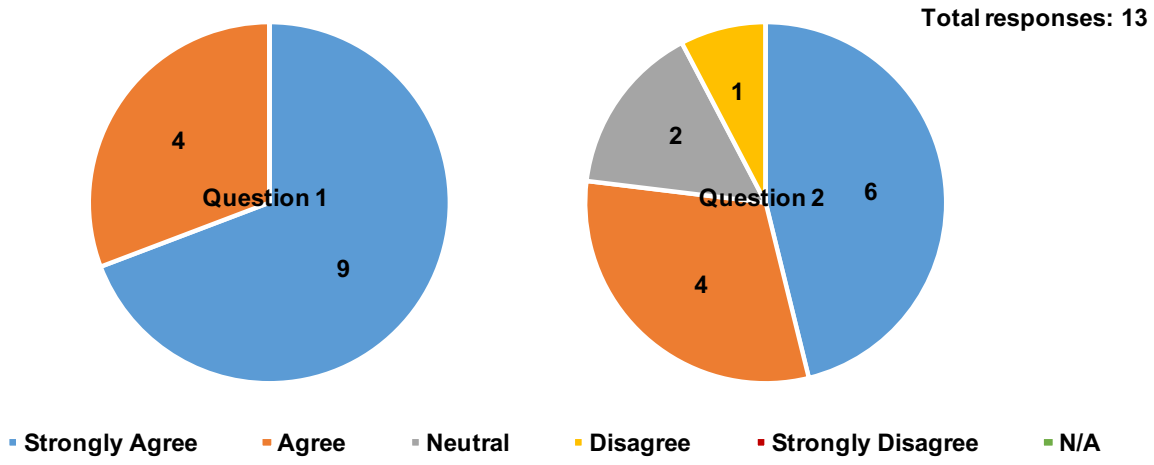
CHEE 315 – Heat and Mass Transfer

My role in this course was split between lab organization, marking and tutorials. The first year I taught this course there were too few student evaluations and they were thus not published in accordance with McGill's evaluation policy. Responses to Likert questions for the following year can be seen below. Students were satisfied with my role in the course – "He is a great TA, very good at explaining and teaching and he is very smart. One of the best TAs I know". However, it was also difficult at times to balance all the course tasks – "Jonathan was always very open to help. His tutorials were good but I think a little more organization would help." Although this variety of tasks was taxing it was also enlightening and gave me a larger appreciation for the effort involved in teaching.



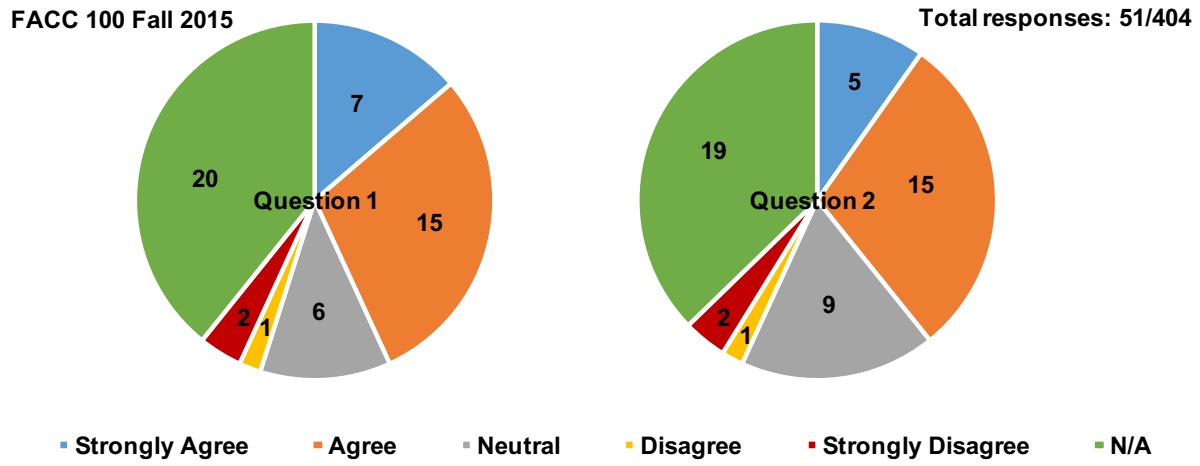
CHEE 687 – Research Skills and Ethics

This was a newly introduced course. I was responsible for creating and grading the assignments and building a rubric for the three-minute thesis (3MT). Many of the students were content with the way the course was run, as shown by the Likert questions results. One student noted that "Jonathan was very approachable and helpful when I asked for help for the 3MT presentation". There were however, some difficulties with aligning assessment instructions with rubrics. This may explain the comment from a student as "being available and responsive to students' questions". To improve for future course iterations I re-vamped the assignment instructions and rubrics following grading and communicated frequently with the the instructor. Although I think the feedback was very good from students, I strive to make all my course activities clear and aligned with the course curriculum.



FACC 100 – Introduction to the Engineering Profession

This was the first faculty-wide engineering course I taught and was a significant departure from previous courses. My main role was grading and administration, and my interaction with students was limited to helping with class activities. This is reflected in the large number of N/A response to the Likert question and the small number of student comments I received, being only two. Both of these comments state my role as "[walking] around the class helping groups understand the nuances of the task at hand." In such classes it is difficult for students to feel a connection to the TA and vice-versa. Despite my role being not as active, I believe there were many valuable course learning activities which helped students connect with the material and with each other. These include in-class team activities, group work, peer evaluation of a writing project, and an instant feedback group portion on the final exam. Executing this variety of learning experiences broadened my teaching perspectives and also demonstrated the need to be highly organized when implementing learning activities with large classes.



Teaching Awards

2015 Faculty of Engineering Outstanding Teaching Assistant Award
Awarded for innovative work in CHEE 423 – Reactions Engineering
This award was given for my role developing long-answer video solutions to tutorial problems and implementing active classroom strategies. Previously the tutorials were largely dedicated to going over sample exam questions. It is these questions that were recorded and transferred online for student viewing. The freed tutorial time was then used to go over weekly quizzes. The quizzes focused on conceptual problems and sought to get students discussing material and misconceptions before further study. The idea with this approach being to focus on interaction and discussion in the classroom rather than content delivery. This technique has been carried forward and a repository of the long-answer videos and quizzes is being built year upon year to provide more student resources.

Professional Contributions

Service Related to Teaching

Tomlinson Project in Undergraduate Level Science Education (TPULSE), McGill University
Roles: Graduate Teaching Fellow and Lead Fellow from June 2014 to January 2016
Duties: Organized and facilitated four two-day graduate teaching workshops per year. Designed and ran workshops for university partners such as Teaching and Learning Services and the Physics Department. Published and presented on pedagogy development at McGill.
Dates: September 2011 to January 2016

Teaching Enhancement Initiative, Faculty of Engineering, McGill University
Role: Research Assistant
Duties: Developed and led workshops on effective teaching practices and assisted faculty and students to implement pedagogical changes.
Dates: January to December 2014

Committee on Teaching and Learning, Faculty of Engineering, McGill University
Role: Graduate Representative
Duties: Represented graduate students and created policies on faculty-wide teaching.
Dates: January 2013 to April 2016

Academic Committee, Faculty of Engineering, McGill University
Role: Graduate Representative
Duties: Represented graduate students and recommended curricular program changes.
Dates: January 2013 to April 2016

Teaching Scholarship

I was fortunate that throughout my doctoral studies I was presented the opportunity to contribute to pedagogical research and literature. In the future I hope to continue these activities by collaborating with students, professors and staff throughout the University. One of the most powerful strategies that I've experienced in my learning and teaching is mentorship and peer-learning. Formal and informal programs already exist at almost every university to make this occur. My vision at The University of British Columbia is to continue to build and support such activities to ensure that students are receiving great educational opportunities throughout their studies. One example of a program the University currently runs is the Teaching Assistant Training Program (TATP) which is developed and run by graduate students and is similar to TPULSE, which I worked with at McGill. I would like to build and strengthen these programs, encouraging student interaction, with the goal of having a mentorship chain all the way through the University. Supporting this goal requires critically evaluating the effectiveness of these activities using control studies with quantitative and qualitative analysis. By undertaking these studies, I hope that we can identify and disseminate successful programs. Universities are currently a very rich place for learning and I believe that by building the teaching skills of everyone in the University, not just those of professors, we can have a profound impact on education.

Articles

Verrett, J., Kietzig, A.-M., & Orjuela-Laverde, M. (2015). I flipped my tutorials: a case study of implementing active learning strategies in engineering. Proceedings of the Canadian Engineering Education Association Annual Conference (CEEA 2015), Hamilton, Canada.

Alajek, S., Ham, A., Heather, M., & **Verrett, J.** (2013). Blurring the line between for-credit curricular and not-for-credit extracurricular engineering learning environments. Proceedings of the Canadian Engineering Education Association Annual Conference (CEEA 2013), Montreal, Canada.

Presentations

Verrett, J., & Orjuela-Laverde, M. (2015). I flipped my tutorials: A case study of implementing active teaching strategies. Paper presented at the 35th Annual Conference of the Society for Teaching and Learning in Higher Education (STLHE), Vancouver, Canada.

Verrett, J. (2013). The Role of Peer-to-Peer Learning in Improving Pedagogical Skills of Teaching Assistants. Presented at the Canadian Engineering Education Association Annual Conference (CEEA 2013), Montreal, Canada.

Educational Leadership

Throughout my Graduate degree I have organized a number of workshops for various organizations. These workshops are listed and described below including: a description of my role, the organizations involved, a workshop description, the semesters the workshops were run with the number of times delivered in brackets, and the total number of students reached through the workshops.

TPULSE Graduate Teaching Workshop
Role: Presenter, co-facilitating with the 5 to 8 other graduate teaching fellows. Each fellow was responsible for a module, and I developed and ran modules on grading and feedback, course planning, active learning strategies, getting to know your students and teaching philosophy. From June 2014 onwards I also oversaw the planning for the workshops as lead fellow.
Organization: Tomlinson Project in Undergraduate-Level University Science Education (TPULSE)
Description: This workshop will provide tools to help you become an excellent TA by offering a practical introduction to science education to complement your discipline knowledge. Using the literature of science education, we will explore efficient ways of teaching that are based on empirical evidence and that can be used to foster significant and enjoyable learning in your lab or classroom.
Length: two-day workshop, 7 hours per day.
Dates: Winter 2012 (2), Fall 2012 (2), Winter 2013 (2), Fall 2013 (2), Fall 2014 (2), Winter 2015 (2), Fall 2015(2), Winter 2016 (2)
Students reached: 400

Grading and Feedback in the Sciences
Role: Presenter, co-facilitating with another graduate teaching fellow.
Organizations: Teaching and Learning Services, Physics TA Association, Association of Graduate Students Employed at McGill (AGSEM)
Workshop Description: During this interactive workshop, TAs learn about grading and feedback in the sciences. Participants will understand how to effectively grade to maximize efficiency, fairness and consistency. Moreover, TAs discover how to provide constructive feedback through the analysis of different strategies, and when best to apply them to maximize student learning.
Length: 1 hour and 30 minutes
Dates: Fall 2012, Fall 2014 (3), Winter 2015, Fall 2015
Students reached: 170

Active Strategies in Science Labs
Role: Presenter, co-facilitating with another graduate teaching fellow.
Organizations: Teaching and Learning Services, AGSEM
Description: This interactive workshop for graduate students running undergraduate lab sections focuses on how to create an optimal lab experience for everyone, from students to TAs and lab technicians. Participants will be introduced to research-supported information on how students learn to help them plan their approach to running the lab; find out how to set up the environment – both physical and social – that encourages a smoother operation of the lab with better and deeper interactions between everyone; and be given a nuts-and-bolts summary of how to execute a lab efficiently.
Length: 1 hour and 30 minutes
Dates: Fall 2014, Winter 2015
Students reached: 80

Joint Orientation Day between Chemical Engineering and Physics
Role: Co-organizer and presenter. I organized this workshop in collaboration with the head of the Physics TA Association. I developed a module on teaching tutorials
Organizations: Physics TA Association, Chemical Engineering Graduate Student's Society
Description: This workshop for graduate students provides effective methods to run tutorials, mark and coordinate labs. These topics are specifically targeted to graduate students in Chemical Engineering and Physics.
Length: 4 hours
Dates: Fall 2016
Students Reached: 30

TPULSE Advanced Learning Techniques Workshop
Organization: TPULSE
Role: Presenter, co-facilitating with two other graduate teaching fellows.
Description: This undergraduate student workshop focuses on giving you the tools to study more effectively. You'll learn how humans form memories and from this how you can make note-taking, class time, independent study and team studying more effective.
Length: 1 hour and 30 minutes
Dates: Fall 2014, Winter 2015
Students reached: 40

Teaching Development

I have always been interested in teaching and my academic career has provided a number of opportunities to develop my pedagogical skills. This development started long before entering University as I informally tutored my friends and taught skiing and bagpiping. During my first-year as an undergraduate I gave informal chemistry review sessions to students in my residence. I started formally teaching in September 2009 when I was hired as a faculty tutor in chemical engineering to help students with introductory courses, a position I held until graduating in May 2011.

The following year, at the start of my doctoral degree, I took the Graduate Teaching Workshop offered by TPULSE and immediately applied to be a fellow. I was keen to learn more about pedagogy and also looked forward to the opportunity to contribute back to the teaching community. As part of the training, I took a graduate education course titled "Teaching and Learning in Higher Education". Throughout the course each student developed a teaching plan for a course in their field, studied educational literature, taught, and reflected on the educational process. It was an eye opening experience, one that I wanted to share with other students at the university.

With that in mind, I began developing and contributing to workshops for graduate and undergraduate students covering a range of topics in teaching and learning. This provided the opportunity to interact with many pedagogical organizations on campus. I am especially proud of the relationships built between Teaching and Learning Services and TPULSE as evidenced by the joint workshops that are listed above. In the future I look forward to working with a variety of partners at Universities to nurture a diverse and effective pedagogical community. Through this work, I hope to grow and reflect on my teaching and share my passion for pedagogy with others.

Appendix

Sample Course Plan

The following course plan was created as part of the curriculum of the course EDPH 689 – Teaching and Learning in Higher Education for a second year thermodynamics course.

DEPARTMENT OF CHEMICAL ENGINEERING
CHEE 220 – Chemical Engineering Thermodynamics
Winter 2012 (4 credits)

Instructor: Jonathan Verrett (jonathan.verrett@mail.mcgill.ca)
Office: Wong building 8300
Office Hours: W-10:30-12:30 (or by appointment)

TAs: Jim Palinski (Wong building 8190) – jim.palinski@mail.mcgill.ca
Office Hours: M-10:30-12:30
Gary Oldman (Wong building 8330) – gary.oldman@mail.mcgill.ca
Patrick Kane (Wong building 9020) – patrick.kane@mail.mcgill.ca

Lectures: M/W/F – 12:35-13:25 (Wong building 1020)

COURSE DESCRIPTION
This three-credit core course for students in chemical engineering will introduce the basic concepts used to define chemical systems. Students will learn to evaluate and appropriately apply models to predict properties of multi-phase and reactive chemical mixtures. By the end of this course students will be able to completely describe the final equilibrium state and properties of complex chemical systems.

COURSE OBJECTIVES
At the end of this course you should be able to:

1. Classify chemical systems using basic thermodynamic properties
2. Understand chemical thermodynamic theory
    a. Apply the phase rule to predict degrees of freedom in a chemical system
    b. Understand phase diagrams and their relation to the phase rule
    c. Understand chemical potential and its relation to fugacity
    d. Apply partial molar properties to model properties of mixtures
    e. Predict vapour-liquid equilibrium in ideal and non-ideal cases
3. Apply theory to appropriately solve thermodynamic problems
    a. Predict properties of fluids from correlations and equations of state
    b. Evaluate and appropriately apply models used to find equilibrium properties
    c. Calculate equilibrium properties of liquids and gasses using vapour-liquid equilibrium models
    d. Find appropriate reaction equilibrium constant based on chemical system

e. Predict how reaction equilibrium changes using Le Chatelier's principle
f. Solve for equilibrium conditions of reactions involving solids, liquids and gasses using changes in Gibb's free energy

TEXTBOOKS
Required text: Smith & Van Ness. Chemical Engineering Thermodynamics (6^{th} ed.)

EVALUATION AND FEEDBACK

CLASS PARTICIPATION 5%
Will be evaluated through activities done in class such as minute papers, concept maps, group presentations and participation in discussion.

CONCEPT QUIZZES 5%
Short 10-minute quizzes done in class on concepts in the course, not heavy on calculations. These are mainly used to see whether material has been understood and if not, what need be reviewed. There will be 6 in total and only 5 will count.

SHORT ASSIGNMENTS 10%
Small assignments of problems to review and practice material from class and also get accustomed to some problems you may see on exams.

MIDTERM EXAMS 20% (2x10%)
Two of these will be done in class during the semester. They will be 50 minutes (a normal class period) and consist of conceptual and calculation questions. These will not be cumulative

LABORATORIES 20% (2x10%)
Two will be done throughout the semester in the afternoon, you will sign up in groups of four at a time that suits you on the schedule. Full lab reports will be written for both of these labs.

FINAL EXAM 35%
Written during the final exam period for 3 hours, this will include all material in the course.

Missing a Midterm Exam, Laboratory Session, Assignment or Final Exam
Missing a midterm exam, laboratory session, assignment or final exam without a valid reason will result in a grade of zero (0). Justifications for missing exams or laboratory sessions must be submitted as official documents (e.g. medical note, certificate of death). The grade weight of justifiably missed midterms, assignments or laboratories will be added to that of the final exam.

COURSE EVALUATION
The course evaluation will be administered online at the end of the course; your feedback is extremely important. Please consult the following link: http://www.mcgill.ca/tls/courseevaluations/mercury/

MCGILL POLICIES

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the code of student conduct and disciplinary procedures (see www.mcgill.ca/integrity for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 398-6009 or online at http://www.mcgill.ca/osd) before you do this.

Additional policies governing academic issues which affect students can be found in the Handbook on Student Rights and Responsibilities, Charter of Students' Rights (online at http://www.mcgill.ca/files/secretariat/greenbookenglish.pdf).

Course Schedule

Class	Class Topics	**Items Due**/Class Assessments
1 Mon Jan 9	1.1 Understand basic properties of thermodynamics	
2 Wed Jan 11	1.2 Classify properties as intrinsic or extrinsic	
3 Fri Jan 13	1.3 Classify systems by their components and phases	**Concept Map**
4 Mon Jan 16	2.1 Apply the phase rule to predict degrees of freedom in a chemical system	**Assignment 1**
5 Wed Jan 18	2.2 Understand phase diagrams and their relation to the phase rule	Concept Quiz 1
6 Fri Jan 20	2.3 Understand chemical potential and its relation to fugacity	
7 Mon Jan 23		**Assignment 2**
8 Wed Jan25	2. 4 Apply partial molar properties to model properties of mixtures	
9 Fri Jan 27		**Online Quiz**
10 Mon Jan 30		**Assignment 3**
11 Wed Feb 1	2.5 Predict vapour-liquid equilibrium (VLE) in ideal and non-ideal cases	Concept Quiz 2
12 Fri Feb 3		
13 Mon Feb 6		**Short lab writeup**
14 Wed Feb 8		**Assignment 4**
15 Fri Feb 10	3.1 Predict properties of fluids from correlations and equations of state	
16 Mon Feb 13		
17 Wed Feb 15		Midterm 1

Class	Class Topics	**Items Due**/Class Assessments
18 Fri Feb 17		
FEB 20-25		
19 Mon Feb 27	3.2 Evaluate and appropriately apply models used to find equilibrium properties	**Assignment 5**
20 Wed Feb 29		
21 Fri March 2		
22 Mon March 5		**Lab 1**
23 Wed March 7	3.3 Calculate equilibrium properties of liquids and gasses using vapour-liquid equilibrium models	**Assignment 6** Concept Quiz 3
24 Fri March 9		
25 Mon March 12		**Assignment 7**
26 Wed March 14		
27 Fri March 16		Concept Quiz 4
28 Mon March 19		**Assignment 8**
29 Wed March 21		
30 Fri March 23	3.4 Find appropriate reaction equilibrium constant based on chemical system	**Concept Map**
31 Mon March 26		**Assignment 9**
32 Wed March 28		Concept Quiz 5
33 Fri March 30	3.5 Predict how reaction equilibrium changes using Le Chatelier's principle	
34 Mon April 2		
35 Wed April 4		Midterm 2
36 Fri April 6		
37 Mon April 9	3.6 Solve for equilibrium conditions of reactions involving solids, liquids and gasses using changes in Gibb's free energy	**Lab 2**
38 Wed April 11		**Assignment 10** Concept Quiz 6
39 Fri April 13	**REVIEW**	**Online Quiz**
40 Mon April 16		

Sample Lab Handout and Rubric

The following lab handout and rubric was created as part of the curriculum of the course EDPH 689 – Teaching and Learning in Higher Education for a second year thermodynamics course. I developed and implemented a similar handout as a TA in CHEE 315 – Heat and Mass Transfer.

CHEE 220: Performance Based Assessment (Lab 2)

Why are labs important?
It's important to learn lab skills, and report writing for multiple reasons. Some of you may eventually work in labs doing research, and most, if not all of you will use data from lab experiments to influence decisions you make in your career (in nearly any scientific field) or in your daily life. As such it is important to know how a laboratory experiment should be run and how to analyze data. Report writing and reading are also key skills that you develop through this exercise as well as teamwork.

Lab Topic
The second laboratory of this course will focus on the vapor-liquid equilibrium (VLE) curve of propanol and water. Each group will collect one data point on the curve in their lab session. You will be responsible for analyzing your data point as well as the curve of the entire classes points to see how they form the VLE curve. You will then try to fit the liquid section of the curve to both the Van Laar and Margules models and comment on the fit of each model.

Lab Session
- Form your own groups of **4 people**.
- Held in **afternoons from Monday, March 5 to Friday, March 23**
- **Signup sheet** can be found on **TA Patrick Kane's door (Wong Room 9020)**
- **Instructions for lab methodology** may be found in the **online handout**

Lab Report
Use the attached rubric as a guide to make your report. The report should be divided into **6 major sections: Abstract, Introduction, Methods, Results, Discussion and conclusion**. After the report there should also be a section addressing **5 out of the 8 questions** found in the lab handout. Choose the questions that are most relevant to your data from the lab. The Rubric consists of 8 sections and may be found below. **You may choose to have your report marked 50% individually and 50% as a group, or 100% as a group**. If you choose to have individual sections, make sure to split the lab report up giving 2 sections to each person in the group, and clearly mark who was responsible for each section on the title page.

Final Copy
Due two weeks after lab completion.

CHEE 220	**Lab Performance Criteria (out of 10)**			
Competency	**Excellent (10,9)**	**Acceptable (8,7)**	**Satisfactory (6,5)**	**Unnacceptable (4 or less)**
1. Create appropriate **title and abstract** (10%)	Title aptly describes lab activity Abstract is concise (<250 words) and contains all the key elements: 1. Brief introduction 2. Main Methods used 3. Main results found 4. Brief conclusion	Title aptly describes lab activity Abstract is concise (<250 words) and contains 3 of the 4 the key elements:	Title lacks clarity at describing the lab activity Abstract is unconcise (>250 words) or contains only 2 of the 4 the key elements	Title has little relation to the lab activity Abstract is unconcise (>250 words) or contains 1 or less of the 4 the key elements
2. **Introduction:** Situate research problem and describes important theory related to the research problem (including theoretical equations) in introduction section (10%)	Introduction is clear, logically constructed and includes all key elements: 1. theoretical concepts 2. all theoretical equations used in calculations	Introduction is not logically constructed and doesn't build on previous scientific concepts, but includes all key elements.	Introduction is not logically constructed and doesn't build on previous scientific concepts and includes only 1 key element	Introduction is not logically constructed and doesn't build on previous scientific concepts and includes no key elements
3. **Methods:** Report methods used in the experiment such that the experiment could be replicated (10%)	Methods are **clear** and **concise** and are a **good** guide to repeat the experiment.	Methods are **clear** although **not concise** and are a **decent** guide to repeat the experiment.	Methods are **not clear** and **not concise** and it would be **difficult** to repeat the experiment.	Methods are **not clear** and **not concise** and **do not relate** to the experiment.

CHEE 220	**Lab Performance Criteria (out of 10)**			
Competency	**Excellent (10,9)**	**Acceptable (8,7)**	**Satisfactory (6,5)**	**Unnacceptable (4 or less)**
4. **Results:** Present data obtained from experimentation without manipulation in appropriate forms (graphs, tables, etc.) in results sections (10%)	This section is well constructed and includes the following **3** key elements: **1.** Data represented appropriately (graphs, tables, etc.) **2.**Data is not repeated **3.**Concise text describing only data obtained	This section is not well structured but includes the **3** key elements	This section is not well structured or includes only **2** key elements	This section is not well structured or includes only **1** key element or less
5. **Discussion:** Show any data manipulation and discuss implication of results in discussion section (30%)	All formulas used for data manipulation are clearly shown and refer back to introduction section Manipulated data is well summarized in appropriate forms (tables, graphs, etc.) Trends within the data are discussed and linked back to theory Possible errors and improvements in lab procedure are discussed and logical.	All formulas used for data manipulation are clearly shown but do not refer back to introduction section Manipulated data is summarized in appropriate forms (tables, graphs, etc.) Trends within the data are discussed and linked back to theory Possible errors and improvements in lab procedure are discussed.	Formulas used for data manipulation are not clearly shown. Manipulated data is not well summarized (tables, graphs, etc.) There is little discussion of trend in data and these are not related back to theory Possible errors and improvements in lab procedure are discussed, but not logical.	Formulas used for data manipulation are not clearly shown. Manipulated data is not well summarized (tables, graphs, etc.) There is little discussion of trend in data and these are not related back to theory There is little discussion of possible errors or improvements in lab procedure.
6. **Conclusion:** Conclusion section	Conclusion contains all the following **4** key elements:	Conclusion contains only **3** key elements	Conclusion contains only **2** key elements	Conclusion contains **1 or fewer** key elements

CHEE 220	**Lab Performance Criteria (out of 10)**			
Competency	**Excellent (10,9)**	**Acceptable (8,7)**	**Satisfactory (6,5)**	**Unnacceptable (4 or less)**
presents main points of experiment and discussion section as well as their implications (10%)	1. Concise 2. Clear explanation of experiment and goals 3. Main points of discussion section 4. Implication of the results from this experiment.			
7. **Questions:** Appropriate answers are given to questions, with reference to the laboratory exercise	**All** questions are answered **concisely** and contain **all correct concepts** with **reference back to the lab activity**	**All** questions are answered, although **not concisely**, and contain **all correct concepts** with **some reference back to the lab activity**	**Not all** questions are answered or some contain **incorrect concepts** with **little reference back to the lab activity**	**Not all** questions are answered or contain **mainly correct concepts** with **no reference back to the lab activity**
8. **Formatting:** Appropriately format report with tables of	Report contains all the following **5** key elements:	Report contains only **4** key elements.	Report contains only **3** key elements.	Report contains **2 or fewer** key elements.

CHEE 220	Lab Performance Criteria (out of 10)			
Competency	**Excellent (10,9)**	**Acceptable (8,7)**	**Satisfactory (6,5)**	**Unnacceptable (4 or less)**
contents and a references section. Appropriate grammar is also used. (10%)	1. less than 5 grammatical errors 2. A table of contents and lists figures and tables 3. Appropriately labeled figures and tables 4. A reference section and MLA references in the text where required 5. Clear section heading, page numbers, and a good layout			

References

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Further references available upon request.