QuEST Progress as of Aug 16, 2022

These tasks are either **completed** or in **progress** - i.e. more than "just started". *Brown italics file paths* are documents in QUEST folder space on EOAS NextCloud or the QuEST Google Drive space being used with summer student Kristie Tai. The "***Chapters***" are those described in the project proposal's "*Project Work Plan, Timeline & Milestones*" section.

Re. Chapter 1 – An Overview of QES in EOAS: Data Collection and Analysis

A) Characterize the present state of QES (Quantitative Earth Sciences) in EOAS

May '22 – present

- **Learning tasks** that students experience in EOAS: qualtrics survey only - data to be gathered early Sept, 2022.
- **CTLT (Carrie Hunter)** agreed to conduct paired interviews in Fall to "*explore the identity of our programs individually and collectively*".
- **EOSC courses mapped against the 2011 EGBC requirements:** see file "*.\QUEST\careers-etc\EGBC-etc\APEGBC-Geo-Syllabus-Geophysics-2011.docx*".
- **Syllabi reviewed** for 27 QES courses (QES only, no engineering courses. Results in "*.\curriculum\syllabi & CLOs\Syllabi-characteristics.xlsx*". **Goal** is to consider options for using syllabi (and other info) to characterize existing QES curriculum, including building consistent CLOs for all courses. Also gain inspiration for faculty interviews – what to discuss? See files "*.\curriculum\syllabi & CLOs\QES syllabi notes.docx*" and "*.\curriculum\instructor-interviews-220509.docx*".
- **Data from EOAS retreats (2019 & 2020) and other background information:** survey results, QES skills "needed", specialization descriptions: there are summaries in file "*PriorArt-220603.docx*", GDrive folder "*background*", but most are incomplete and unknown authors. However, they are an indication of Dep't perceptions about QES curriculum at that time, although based on incomplete sampling.
- **Data from 2015 EOAS alumni survey:** open responses to question "What additional skills or experiences could have been a part of your EOAS degree?" coded and summarized. See "*alumnidata-2015.xlsx*".

Dec '21 – Apr '22

- **Syllabi request** sent for 29 QES courses to instructors from 2021W; April 11, 2022.
- **QES dependencies interactive maps** summarizing relationships between EOAS's QES courses & prerequisite math, physics, compsci courses. See https://www.eoas.ubc.ca/~quest/. Files in folder "*.\curriculum\the ~quest webpage*".
- **QES Prerequisites** are also summarized as a matrix: "*.\curriculum\the ~quest webpage\AllPrereqs.xlsx*". Summary version of the matrix is at https://www.eoas.ubc.ca/~quest/.
- **Observations and comments** about QES course dependencies based on interactive maps: see file "*.\curriculum\the ~quest webpage\curriculum-analysis.docx*".
- **Quantitative skills in EOAS courses** from instructors: we have 28 out of 32 respondants.
    - Data in "*.\curriculum\QES course outlines\QES-coursematrix-220216.xlsx*"; i.e. "outline" files for each course returned from instructors.
    - An overarching summary is in file "*QESoutlines-summary.docx*".
- AGU **poster** presented. See poster at AGU or locally on EOAS server.
- EOAS **faculty interview** design in file "*.\curriculum\instructor-interviews-220302.docx*".
    - Concrete feedback from CTLT (Carrie Hunter) is being used to refine the protocol.
    - Second version shipped for feedback March 3rd.
    - 3rd version in "*.\curriculum\QES course outlines\instructor-interviews-220307.docx*"
    - Could be discussed with QuEST committee.

Before Dec 2021

- **Curriculum review background** summarized in "*.\curriculum\QES-baseline-tasks.docx*". Meetings with C. Hunter (CTLT curriculum support) helped establish these "next steps" as of July 2021.
- **Quantitative skills in EOAS courses**: Open questions requested for 32 courses (Feb-Dec 2021)

B) Why now? The case for renewal of quantitatively oriented curriculum in EOAS

May '22 – present

- CSIC is interested in supporting **career-related** research regarding QES occupations.
- **Background research: A Zotero** reference list generated, many annotated; ongoing.

Dec '21 – Apr '22

- Establish communications with **Dawson Club** president (geophysics student) Mehek Mathur. Goal is to discuss with students how they see the relationship between their studies at UBC and their aspirations for occupations beyond.
    - Reconnecting with Mehek – Mar 7th.
- **Student interview procedure**:
    - Ver1 with excellent feedback from CTLT (Carrie Hunter) to refine the protocol.
    - Ver2 in file "*.\careers\engage-students-220228.docx*".
- Discussion with Shaun Barker re**. training needs at MDRU**, both for students and ProD for professionals. See FJ OneNote *takeaway messages* under "meetings", Feb 22, 2022.

Before Dec 2021

- Summarize "**Student Experiences in EOAS** Specializations" (A. Jolley, March 2020). "*.\sources\EOAS Specializations survey notes 210705.docx*".
- **One-on-one discussions**, CS with colleagues in EOAS (documented in notes & emails and "*.\background\QUEST-summaryfor-deptreview-210430.docx*" dated April 2021).
- Relevant sections of **AGU publication** "Vision and Change in the Geosciences: The Future of Undergraduate Geoscience Education" summarized in "*.\sources\AGI Vision&Change summary.docx*".
- Feedback survey involving current & former students of EOAS **geophysics** program (A. Jolley, 2018). Short report in file "*.\sources\EOAS GEOP Survey Report 2019.pdf*".
- "EOS Survey of **Hiring Practices** in Geoscience Industries, 2010". Also "*.\sources\geosci-hiringpractices-2010.pdf*".
- Data from Dep't spring **retreats**, 2019 and 2020. File "*.\sources\concepts & tools retreat 200721.docx*".

Re. Chapter 2 – Beyond EOAS: Engagement and Market Research

A) Relationships with people at peer institutions, alumni and industry

May '22 – present

- Letter to request showcase information is being prepared (see Google Drive). Also a model for showcase pieces (also a Google Doc).
- Example showcase page (FJ) is on Quest Blog here.
- List of potential employed individuals to interview is in progress. Goal is to showcase QES occupations & impacts on society. Possible interview questions are being compiled.

Dec '21 – Apr '22

- **Engage with BC Geophysical Society** http://www.bcgsonline.org/
    - Attended 2021 AGM (Dec 2021) and KEGS / BCGS breakfast at Vancouver Roundup (Jan 2022)
    - FJ has joined BCGS and KEGS executive with three longer-term goals:
        - Increase awareness of geophysics scholarships and increase number of UBC students who apply;
        - Increase student engagement in BC (and Canada) society activities;
        - Leverage society membership to showcase breadth of inspiring geophysical activities in the service of society.
        - Seek opportunities for EOAS faculty to connect with BCGS activities (occasional seminar, etc.)
    - March 9th: highly effective meetings with KEGS Foundation BOD, "councilors" and AGM. These represent important networking links into consulting, industry, government and academic people involved in "geophysics". This enables us (QuEST) to **help mobilize the pan-Canadian geophysical community** to take

actions related to **promoting** and **supporting** quantitative Earth science learning within degree programs and beyond.
See FJ's file "*.\Nextcloud\FJwork\bcgs-kegs\KEGS\KEGS-ActionOptions-220309.docx*".
    - BCGS **internship** awards given to 4 UBC students (no other applicants).
- New **community** connections: **U. Calgary** (Brandon Karchewski) is renewing their complete Geoscience curriculum.
- Initiated **communication with MDRU** regarding increasing needs for geophysics expertise in resource exploration and management for the "greening" of world economies. See FJ OneNote *takeaway messages* under "meetings", Feb 22, 2022.

Before Dec 2021

- Summary of **geophysics programs** at 5 peer institutions, (C. Hunter, 2020) summarized by FJ in file "*./peer_institutions/geop-prgms-summary.docx*".
- Preliminary list of **peers, alumni & industry contacts** is ".\careers\outside-UBC-contacts.xlsx".
- **One-on-one discussions**, CS with colleagues at 7 peer institutions; summarized in "*./peer_institutions/specific feedback/peer-institution_summary.docx*".
- **Alumni**: Preliminary contact with Kim Duffel, regarding Faculty of Science alumni. Also, results of EOAS alumni survey from 2015 in "*.\marketing\alumni\EOAS Alumni Survey 2015 Report JM.pdf*". Also other docs in that folder.

B) Enhance the visibility of QES in EOAS, including recruitment

May '22 – present

- **EOAS website updates:** Undergrad section adjustments are progressing (Aug 10). See GDrive "marketing" folder.
- **Worklearn student** job proposal approved for winter 2022W. Work priorities depend on project committee priorities and student's interests / skills. They'll work 10hrs/wk between Sept 1 and April 30, for up to 300hrs total.
- Recommendations for EOAS website updates from student's (Kristie Tai) perspective (Undergrad & Education sections) is in progress.
- A flyer about QES is being prepared, for public, prospective students, and others.
- Marketing ideas – in progress.
- List of jobs available in June 2022 to QES graduates (via LinkedIn & UBC career support) is in progress. We'll likely generate some guidelines for students to help them begin their own searches.
- List of potential employed individuals to interview is in progress – see Ch2 (A) above.
- Poster presented for UBC's TLEF showcase event, May 9th, 2022. Title: "**Re-invigorating Quantitative Curriculum for Earth, Ocean & Atmospheric Science Specializations**".
- Letter to principal of UHill Secondary – see email sent June 15, 4:35pm.

Dec '21 – Apr '22

- Researched **Canadian scholarship** opportunities for geophysics (and similar) students. See file "*.\FJwork\bcgs-kegs\geophysics-scholarships.docx*".
    - BCGS/KEGS scholarship opportunities summarized and shipped to UBC ugrads and EOAS faculty.
    - Notes about scholarships are accumulating in file "*.\FJwork\bcgs-kegs\scholarships-notes-220210.docx*".
- Listing of recommended **EOAS website updates** is in progress (file "*.\marketing\EOAS-website\EOAS website recommendations 210705.docx*"), including clearer information for students about scholarships and awards they can apply for (QES focus for now), pointers to various UBC and Faculty of Science geophysics, ATSC, and OCGY career pages, summary of alumni information derived from LinkedIn (eg here), pointers to geoscience societies, and more.
- **Worklearn student** job proposal approved for summer 2022s. Work priorities depend on project committee priorities and student's interests / skills. They'll work ½ time between May 1 and Aug 31, for up to 300hrs total.
- **Worklearn student**: Kristie Tai, atsc 4th year student chosen – hiring is under way (Apr 01)
- **Student engagement**: recommendations reworked for discussion with Mitch. Goal is to improve student experiences, motivation, career options, networking opportunities and visibility of QES in EOAS. See FJ's OneNote under quest "meetings", April 4th.

Before Dec 2021

- New EOAS **website** makes QES more visible, including: a) New "Education" section, b) enhanced "Undergrads" section, c) Improved "degrees" and "careers" sections for undergraduates, d) Alumni and student success / stories are more prominent
- **Website** content to be further improved during a second round of EOAS website updates. Ideas in *".\marketing\EOAS-website\EOAS website recommendations 210705.docx*".
- Faculty of **Science Co-op** web pages related to EOAS specializations have been updated (Sept 9, 2021). See:
    - https://sciencecoop.ubc.ca/employers/disciplines/eosc
    - https://sciencecoop.ubc.ca/prospective/apply/eos
- Connection with **Geering Up** established (first contact only – *zoom meeting, May 7, 2021*)
- Possible partnering with "Empower the Future" initiated, possibly in partnership with PME (*emailed June 17th*) and Bean Sherman and EOAS undergrads (to be pursued).
- New **first year course** concept begun: "Climate Physics", or similar. (*G-Doc by CS, with RW comments.*)
- Introducing quantitative / conceptual **climate content into eosc1xx** courses via OCESE (Stephanie W. is lead). Any lessons learned or resources generated could benefit a new first year course. See the Google sheet with listings and pointers.
- **EOSC1xx course demographics** and grades summarized to help argue for a new eosc1xx course with more quantitative perspectives. See summary in file ".*\first year course\ eosc1xx-demographics.docx*".
- EOAS version of **DSCI100**, "intro to data science": **OCESE** is converting this from R to Python. L. Heagey will teach R-version in January 2022. A version with EOAS context is being prepared for introduction in teaching season 2022W.
- Preliminary meetings with **Heads of** Math, CS, Phys, Stats regarding potential to include EOAS "guest lectures" in early quantitative course in other departments. (One meeting only so far)
- **MATH courses**: changes in progress (January 2022) with strong Math Education support and expertise. Ongoing interactions are in progress: contacts are Head, Matt Coles (Education Program Director), Gaitri Yapa (SES). QuEST goal: better characterization of "coverage" in QES math prerequisite courses. That means helping them articulate useful course learning outcomes (CLOs).
- Preliminary discussions about increasing visibility of QES in **Vantage College** (BG now on leave until July '22)

Re. Chapter 3 – Pathways forward: Curricular Recommendations

A) Curriculum renewal: articulating the forward-looking needs of students, preferences of faculty, and resulting opportunities for enhancing QES curriculum in EOAS.

May '22 – present

- **Project documentation (blog)** at https://blogs.ubc.ca/eoasquest/. This can be edited by faculty, staff or students with a CWL. Other options (Jupyter Book, CMS website, Wiki, GoogleDocs) are less flexible or less well organized.
- **Capstone projects and courses**: Carrie Hunter has prepared a very nice summary of the types, roles, benefits and keys to success. See document ".*\background\Capstone Courses and Projects.docx*".
- **Interviews** with faculty are in progress (Kristie Tai). Focus is on how they balance learning about discipline-specific fundamentals and "career preparation". See Google Sheet for summary.
- **Project report:** report outline is in ".*\admin&rprts\QuEST-rprt_outline-220810.docx*". Also notes on content in ".*\admin&rprts\QuEST-rprt-notes.docx*".
- CSIC provided a preliminary list (including search methods) of articles about **embedding career development within geophysics or math** ugrad degrees. See ".*\background\sources\QuEST_Geoph-Math_LitReview-FJ.docx*". Notes on ways we might incorporate some of those ideas into QES curricula are included.
- CSIC is eager to contribute expertise related to **balancing career preparation and discipline-specific learning**, as well as "**curriculum mapping**".

Dec '21 – Apr '22

- Initiated contact with **UBC Centre for Student Involvement and Careers** – Kimberley Rawes.
    - First meeting Feb. 3rd, 2022. Goal is to partner with them to benefit from expertise on careers and enhancing the relationship between curriculum and career options.

- Mar 7th a second meeting is being arranged to (a) learn about how science programs balance the competing curricular goals of "career development" versus "gaining fundamental knowledge", and (b) discuss ways that CSI&C can assist with QuEST.

- Regarding **curricular dependencies** among ATSC, EOSC, and ENVR courses: see early observations and recommendations in "*.\curriculum\the ~quest webpage\curriculum-analysis.docx*".
- Recommended **QuEST project actions** are in "*.\admin&rprts\QuEST-recommendations220524.docx*".

Before Dec 2021

- **Goals** are to (a) generate options for enhancing QES curriculum and degree options and (b) implement means of recruiting suitable students into QES courses and specializations.
- Needs **discussion** with committee members.
- **Micro credentialling options**: Some thoughts on options, methods, precedent and local examples of delivering short prgrms to grads, non UBC students, industry or other interested parties: See CS's notes in file *.\curriculum\micro-credential-ideas.docx*.