

ANNUAL REPORT

Environments of Change

2020 – 2021

UNIVERSITY OF
WATERLOO



Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada 

ANNUAL
REPORT

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Congratulations



Environments of Change

Above: historic map of Northeve courtesy of Leah Fusco / Julian Porter / Bexhill Museum

DIRECTOR'S MESSAGE



While the COVID-19 pandemic posed significant challenges to us all, and undeniably altered the course of what we could achieve as researchers, it also forced us to take stock and provided an opportunity to pivot into new areas. On the one hand, EOC was unable to send team members or HQP to our UK base at Herstmonceux, to place students with external partners in Canada, the US, or the UK, to perform remote field work, or even to meet in person with one another. On the other hand, my executive team and I were able to redirect funding from those planned activities into several exciting research initiatives, accelerating their progress and ensuring their success. In this Report, therefore, you will find evidence of how our much-anticipated tablet-based pedagogical video game has progressed, and you will read about the significant investment we have made in developing dendrochronological proxy data from the south-east of England. Likewise, my team and I worked hard to expand the scope and breadth of our partnership. While our current funding model focuses on developing technologies that shine light on late medieval English environment, we always conceived of EOC as offering a transposable framework for interdisciplinarity within the digital humanities. To that end, I am pleased to report that we expanded our research to support work

in the Mediterranean basin around Montpellier. We are also now poised to offer partnered support with scholars working on the trans-Atlantic slave trade in Sierra Leone. This ability to adapt and grow is at the heart of what we always hoped EOC would become. It also shows resilience and commitment to the ideals of truly transformative collaborations even in the face of profound systemic challenges. None of this would have been possible without the tremendous flexibility of our granting agency, the SSHRC. As Canadian scholars, we benefited from a granting agency that recognized the crisis and also adapted with us. In the same way, our university host, Waterloo, our other postsecondary partners and our community partners in Canada, the US, and the UK all demonstrated remarkable agility. All of this allowed us to carry on in the face of adversity and to prosper while staying safe.

I am proud of what we achieved this past year and I remain optimistic about the future of EOC. As vaccines continue to alter the course of the pandemic, I look forward to a time when scholars and partners can once again meet in person to resume many of our planned activities within Canada and abroad.

HQP REPORT



Objective 2 of our project originally proposed 467 unique HQP training opportunities over 7 years. In Year 1, we cancelled our planned Summer Archaeology Field School due to the onset of COVID-19. Still, that year we provided roughly \$360,000 in HQP funding to some 40 individuals.

This past year, Year 2, was further curtailed by the closure of the DRAGEN Lab (**Objective 1**), our training hub in Waterloo, of all in-person Canadian campus learning spaces, and of most partnered agencies' offices. We, nonetheless, remained committed to providing HQP opportunities where possible and worked with the BISC to pilot a virtual archaeology field school.

In Year 2, thus, we invested over \$206,000 to provide 23 unique HQP opportunities.

Through the DRAGEN Lab, we allocated approximately **\$117,894** to student salaries and benefits to fund:

- | | |
|-----------------------------|---|
| 1. BRUNET, Melanie | UW BSc Student (Physics & Earth Sciences) |
| 2. DAVIES, James | SJU / UW BA Student |
| 3. DAVIES-KNEIS, Caleigh | UW BA Student |
| 4. DOHERTY, Hannah | UW MA Candidate (History) |
| 5. FONTES, Sara | University of Toronto MLIS (Library & Information Sciences) |
| 6. GERGAL, Jacqueline | UW MA Candidate (History) |
| 7. HAMID, Owais | UW MEng Candidate (Engineering / Robotics) |
| 8. KACHUCK, Zachary | UW MA Candidate (History) |
| 9. KURIAN, Erin | UW MA Candidate (History) |
| 10. LEE, Jason | UW BA Student |
| 11. LUCAS, Megan | UW BA Student |
| 12. MOORE, Andrew | UW PhD Candidate (History) |
| 13. RACICOT, Tobin | UW PhD Candidate (English) |
| 14. SIEBEL-ACHENBACH, Ellen | UW BA Student (Medieval Studies) |
| 15. TARDIF, Jordan | UW MA Candidate |
| 16. VERSCHOOR, Jessica | UW BEnv Student (Earths Sciences / Medieval Studies) |
| 17. ZETTLE, Jamie | UW PhD Candidate (History) |
| 18. ZELEK, Dawid | UW BA Student |

EOC also provided **\$88,167** to support these students outside the DRAGEN Lab:

- | | |
|-------------------------|-----------------------------------|
| 19. GRAVENOR, Joseph | BComp Student, Queen's University |
| 20. IBACH, Connor | BASc Student, Queen's University |
| 21. LAPORTE, Kyle | MSc Candidate, Queen's University |
| 22. McConkey, Codie | BComp Student, Queen's University |
| 23. MONTAGANO, Anthony | Brock University |
| 24. YANG, Jifan | MSC Candidate Queen's University |
| 25. Postdoctoral Fellow | Queen's University |



A proof-of-concept station for the Northeye Village is shown sitting atop a physical table. Game players can move their iPad to see the village from different perspectives and to watch villagers go about their daily tasks.



Digital model for use in low-resolution water defence prototype of double sluice at Northeye with top timbers removed

SPOTLIGHT ON TOBEN



HQP Toben Racicot (Waterloo, Games Institute) works under the supervision of Neal Randall (Waterloo, Games Institute) to develop an analogue board game inspired by the historical environment of late medieval Sussex. In it, players must manage natural resources and production controlled by Battle Abbey. Toben's game will be playable in both tabletop and digital

versions and will offer players another point of access to engage problems of historical environment.

Toben's doctoral research focuses on role-playing games, collaborative world building, loot mechanics, and the magical circle in digital forms. His dissertation examines affordances and constraints of player character generation systems and game design that allows players to explore digital spaces in single-player role-playing games. Toben is co-host of the Games Institute podcast.

EOC's pedagogical video game project (**Objective 4**) recreates the deserted medieval village of Northeye, once situated on an elevation in the Pevensey Levels. The game requires players to navigate various environmental problems related to aquatic environments, crop management, and salt production and is modelled on archival, archaeological, and geological data.

Throughout Year 2, Nick Graham (Queen's) coordinated activities and held monthly meetings with Rob Harrap (Queen's), Zack MacDonald (Western), Andrew Moore (Waterloo), Steven Bednarski (Waterloo), Alison Bullock (WRDSB), and Stephanie Hartmann (Waterloo). Four Queen's HQP also made significant contributions: Jifan Yang, Connor Ibach, Joseph Gravenor, and Kyle Laporte. Other EOC experts were invited as needed, including visual artist Leah Fusco (Royal College of Art), John Johnston (Waterloo), and Derek Robinson (Waterloo). The Northeye team is inherently transdisciplinary and comprises educators, historians, geologists, and computer scientist / game designers. To track progress, the team maintains a robust wiki, which can be made available to any EOC member upon request.

In 2020 – 2021 the team produced five concrete outcomes:

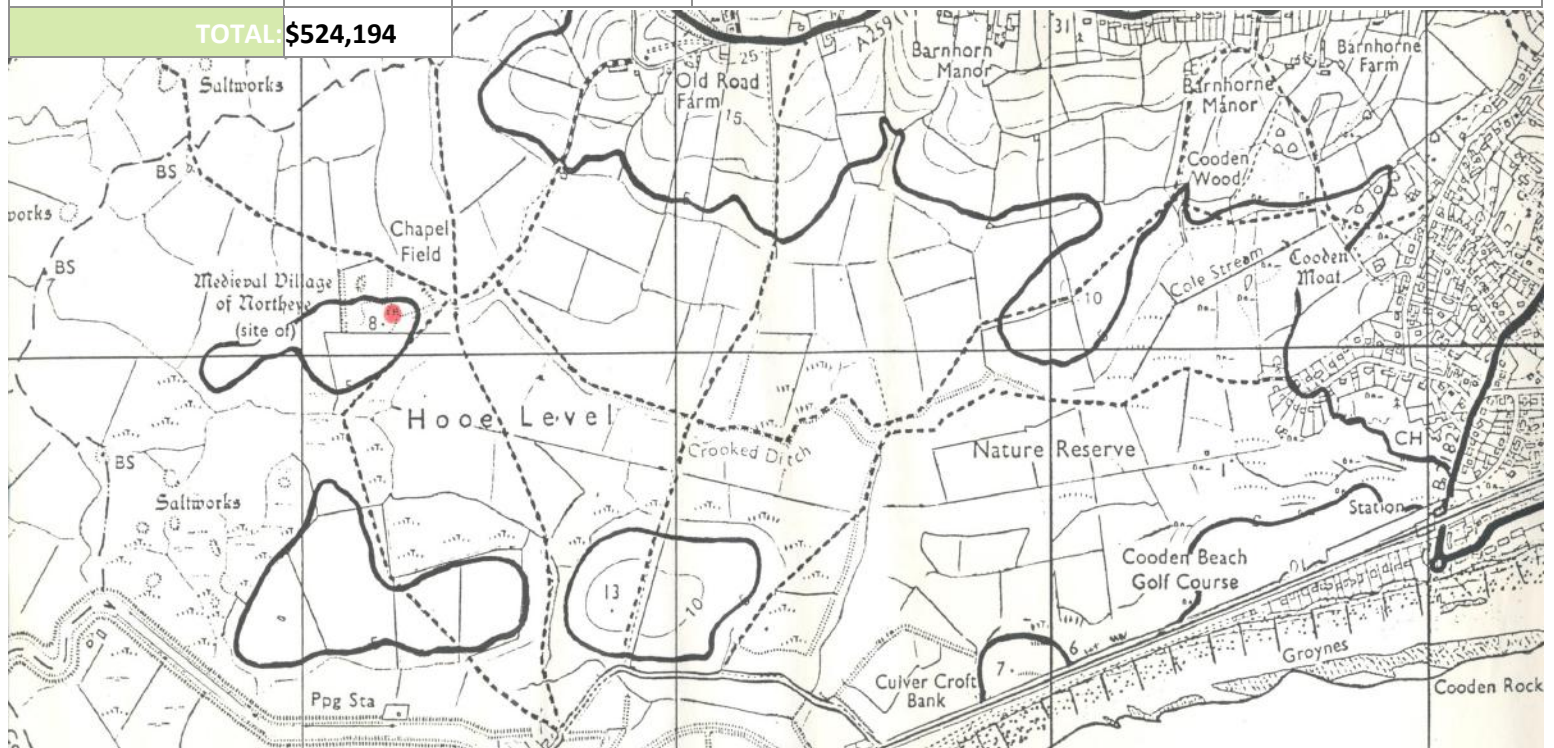
- **Learning Objectives:** Learning objectives for the game have been codified and placed in context of the Ontario Curriculum.
- **Environments of Change Wiki:** This wiki captures educational objectives and context, historical information about Northeye and the Pevensey Levels, and design of the Northeye game.
- **Water Defence Game Prototype:** MSc student Jifan Yang created a low-fidelity prototype of the Northeye Water Defence game.
- **Northeye Engine:** BComp students Codie McConkey and Joseph Gravenor continued development and testing of this software platform. It has been used to develop five proof-of-concept stations, and underpins the development of the Northeye Water Defence game.
- **Chapter Submitted:** With the support of partner Ray Siemens' (Victoria) ETCL and Caroline Winters (Victoria), the team co-authored a detailed methodological chapter for the *New Technologies in Medieval and Renaissance Studies* series.

RESEARCH REPORT

Each year, EOC makes significant financial investments to support team member research. In 2020 – 2021, as a result of COVID-19 disruptions, however, EOC redirected additional capital and operating funds to our researchers. These funds represent an extraordinary level of investment in our shared goals and objectives. Together, we developed new possibilities, provided for the acquisition of new equipment, and accelerated some project timelines. In Year 2, the following team members received funds to perform research, acquire infrastructure, train HQP, and accomplish our collective goals:

Recipient	Year 2 Value	HQP	Outcome(s)
BISC	\$24,765	2 MA students	Continued operation of Science Lab, installation and oversight of local dendrochronology testing, creation of museum installation
Graham, Nick	\$76,467	2 BComp students 1 MSc student	1 article (NTMRS chapter) Video game-related development (see pg. 4)
Harrap, Rob	\$23,750	1 BSc student 1 MSc student	1 journal article (NTMRS chapter) Game-related development (see pg. 4)
Johnston, John and Martin Ross	\$25,000	4 BEnv / BSc students	Literature review, 4 posters, 4 online presentations
Loader, Neil	\$129,212	1 PhD candidate	1 journal article 1 public lecture Audit of tree-ring samples, collection of cores, preparation of samples
Randall, Neil	\$8,500	1 PhD candidate	Table-top and digital board game on late medieval environment
Robinson, Derek	\$228,000	1 PhD Candidate	Preparation of NSERC grant application Acquisition of drone and high-res Lidar camera
Strack, Maria	\$8,500	1 BSc student	Literature review, posters, online presentations
Tingley, Jane	<i>carried over from Year 1</i>	1 MA candidate	Preparation of SSHRC grant application Development of networked sculptural sensor hub and in-gallery installations

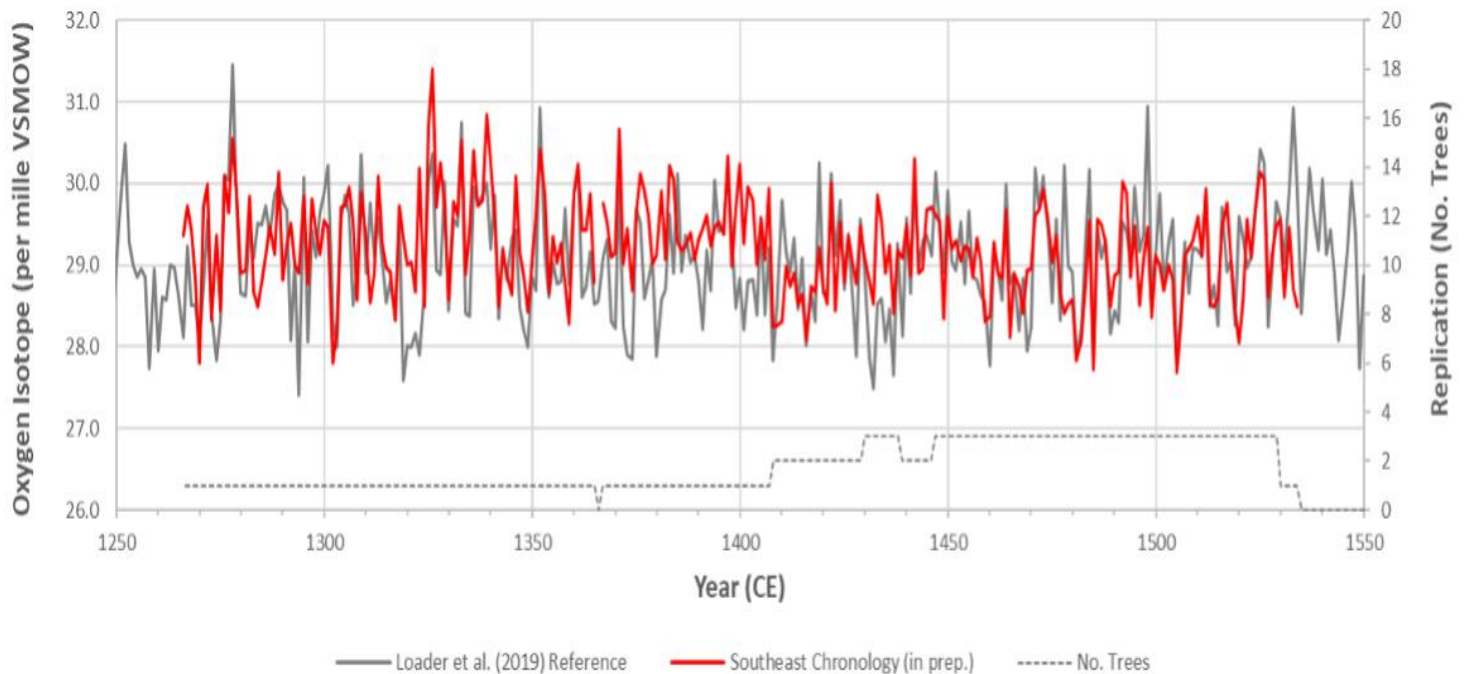
TOTAL: \$524,194



Beyond the outputs listed on the previous page, a number of team members produced work that aligns with and advances EOC's goals and objectives. Some 2020 – 2021 highlights include:

BEDNARSKI, Steven MOORE, Andrew NEWFIELD, Tim	“New Interdisciplinary Approaches to Life, Land, and Environment at Herstmonceux,” in Miriam Muller (ed.), <i>Routledge Handbook of Medieval Rural Life</i> . Routledge History Handbooks. Abingdon: Routledge, 2021.
BROWN, David	<i>Friends of Laura Secord Website</i> . A comprehensive website with maps and information on the Laura Secord Legacy Trail, background information on Laura Secord and her contemporaries, 65+ Secord-related points of interest, TripClip interpretive audio, mapping functions, multimedia content, itinerary planner, and other interpretive information.
DUMAS, Geneviève	G. Dumas, “Santé publique et gestion des effluents urbains à Montpellier à la fin du Moyen Âge,” <i>Bulletin historique de la ville de Montpellier</i> 42 (2020): 82-99.
JOHNSTON, John	“Cores to Drones: Understanding Shoreline Behavior, Processes, and Coastal Landscapes” (conference paper), <i>Geological Society of America, North-Central Section Conference</i> , 18 May 2020.
NEWFIELD, Tim	Newfield, T., L. Mordechai, M. Eisenberg, A. Izdebski, J. Kay, “Doing History: Plague Past and Future - A Second Response to Mischa Meier,” <i>Medizinhistorisches Journal</i> 55 (2020): 297-298. J. Luterbacher, Newfield, T.P., E. Xoplaki, E. Nowatzki, N. Luther, M. Zang, and N. Khelifi, “Past Pandemics and Climate Variability Across the Mediterranean,” <i>Euro-Mediterranean Journal for Environmental Integration</i> 5 (2020): 46.
ROBINSON, Derek	Zhang, J., and D.T. Robinson, “Replication of an agent-based model using the Replication Standard,” <i>Environmental Modelling and Software</i> , 139, 105016. Meinen, B. U., & Robinson, D. T. (2021). “Agricultural erosion modelling: Evaluating USLE and WEPP field-scale erosion estimates using UAV time-series data,” <i>Environmental Modelling and Software</i> , 137, 104962.
ROSS, Martin	Rice, J.M., M. Ross, R.C. Paulen, S.E. Kelley, J.P. Briner, “A GIS-based multi-proxy analysis of the evolution of subglacial dynamics of the Quebec-Labrador ice dome, northeastern Quebec, Canada,” <i>Earth Surface Processes and Landforms</i> , July 2020.
SIEMENS, Ray	Winter, C., T. Fontenot, L. Meneses, A. Arbuckle, R. Siemens, and the ETCL and INKE Research Groups. 2020. “Foundations for the Canadian Humanities and Social Sciences Commons: Exploring the Possibilities of Digital Research Communities.” <i>Pop! Public. Open. Participatory</i> , no. 2: n.p.
SLAVIN, Philip	P. Slavin, “Climate, Pathogens and Mammals: England in the Age of Emerging Diseases, c.1279-1362,” in Miriam Muller (ed.), <i>Routledge Handbook of Medieval Rural Life</i> . Routledge History Handbooks. Abingdon: Routledge, 2021. P. Slavin, “Mites and merchants: the crisis of English wool and textile trade revisited, c. 1275-1330,” <i>Economic History Review</i> 73 (4): 885-913.
SLAVIN, Philip BEDNARSKI, Steven MOORE, Andrew MacDONALD, Zack	Environments of Change: Late Medieval Landscapes, Communities, and Health (panel with four papers), 56 th Annual Congress on Medieval Studies, University of Western Michigan, 10 – 15 May 2021.

DENDROCLIMATOLOGY



In last year's *Annual Report*, EOC announced the addition to the project of Prof. Neil Loader (Swansea) and his collaborators. The Swansea team joined us in April 2020 (with funding and contracts in place by August). This period coincided with the closure of Swansea and several British lockdowns due to the COVID-19 pandemic. While the pandemic limited their ability to conduct field sampling, to perform lab work, and to participate in UK-based HQP formation and outreach, they nevertheless have made progress towards the project objectives.

In 2020 – 2021, team members completed an audit of the tree-ring samples currently archived for the southeast of England, East and West Sussex, and Kent (**Objective 3**). So far, they have identified samples and prepared spanning from just before AD 1000 to the late 1780s, but with very low (if any) replication before AD 1200 and after AD 1600 (depicted above). Some selective coring of early and more recent historic buildings in the area will help to increase the replication at the extremities of the 1000-year chronology. The three centuries from 1200 – 1500 have almost 10-tree replication, and lab research will focus on this period for initial development of the climate reconstruction.

Some of the samples selected for analysis from dendro-dated sites have not been dendrochronologically-dated or have failed to date using ringwidth dendrochronology. These have also been prepared to test the use of the isotope chronology for dating undated material and as a source of additional replication. The team is currently preparing to cellulose for stable isotope analysis those samples from 1200 – 1600.

A further interesting development was the invitation to date the remains of a mediaeval chest located in the church at Mayfield. Two cores were collected, one was successfully dated by ringwidth dendrochronology, and a second shorter core failed to date. The chest front dates to circa 1300, although it is hoped that the dating of the second sample will help refine the estimated date. We will be measuring isotopes on both these core samples with the intention to include their data in our reconstruction. The chest also provides a fine example of carved oak for incorporation into the virtual reality elements of the project.

Finally, the team has received some samples from living trees from a local sawmill in Petworth West Sussex, harvested at the end of the 2020 growing season. These samples will help to strengthen the modern calibration / comparison with existing modern isotope series. In addition, EOC Partner, the BISC, has collected a series of increment cores from living trees on the Herstmonceux estate and has set-up five automatic dendrometers (tree-growth sensors) to provide data and datasets to students for projects in coming years. Ringwidth analysis of the living tree cores, and disc samples will commence shortly to determine the age of the oaks on the estate.

MOBILE TOURISM APP

Year 2 saw the development of a prototype tourism app (**Objective 5**) for the Herstmonceux estate using a platform developed by Dave Brown (Brock) and previously tested along the Laura Secord Trail in Ontario. To transfer the app to a more confined historical site in the UK, and to develop content based on archaeological and archival evidence, HQP Anthony Montagano (Brock), Erin Kurian (Waterloo), and Jacqueline Gergal (Waterloo) worked with Partner BISC's tour guide Barry Howse.

Because COVID-19 prevented access to the physical site and since proxy data evidence from the site is still in progress, the tourism team opted to test the platform using easily accessible content derived from more modern historical sources: those that date from the period 1935 – 1945. This allowed for integration of photographic and written evidence from the Second World War as well as newly recreated digital reconstructions of now-absent wartime structures.

The team had hoped to test the mobile platform against a similar experience using Google Tour Creator, an immersive VR interface, and Google Expeditions. Google, however, discontinued both platforms and so the team halted their planned comparative analysis.



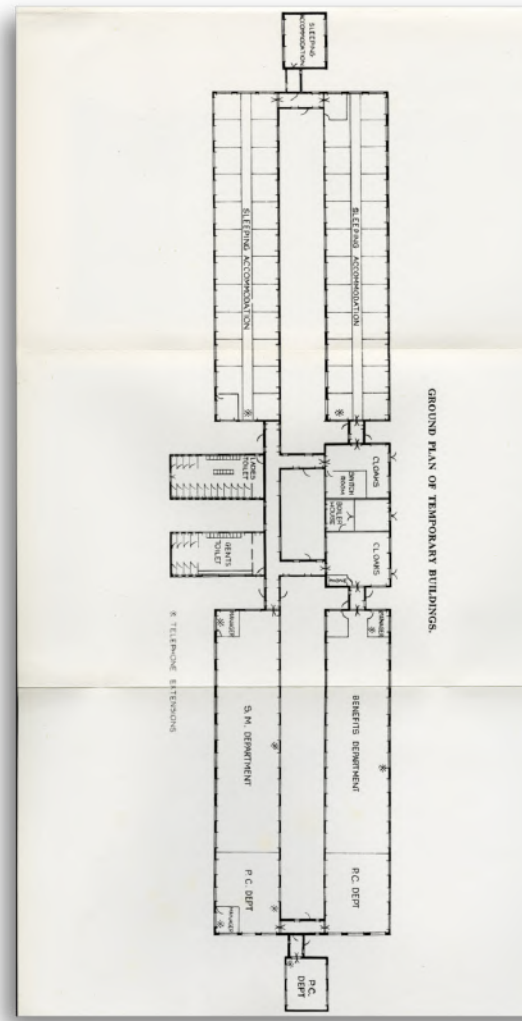
Anthony Montagano (Brock)



Jacqueline Gergal (Waterloo)

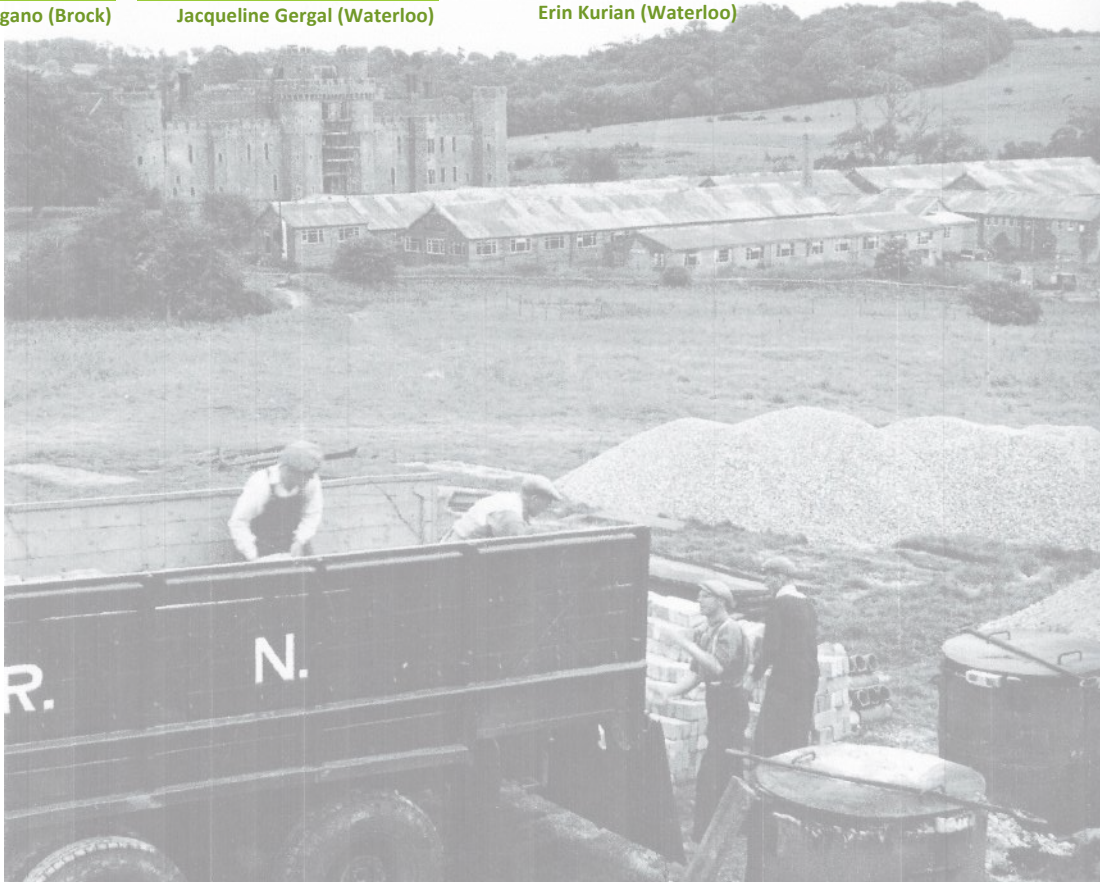


Erin Kurian (Waterloo)



Above: Floorplan of demolished administrative building

Below: Photograph of administrative building in front of Herstmonceux Castle, c. 1941





INCLUSION, DIVERSITY, EQUITY, ACCESS (IDEA)

EOC is mindful of the shortcomings of traditional systems of knowledge formation within the academy and strives to promote inclusion, diversity, equity, and access across all its operations. To that end, in June 2020 the project’s executive launched dedicated DRAGEN Lab internships and an award of excellence, both intended to support Black, Indigenous, Asian, Hispanic, and People of Colour on the UW campus. Internships consist of paid work-study placements valued at \$9,000 per academic year and may be renewed for up to four successive years. Through these internships, eligible students will acquire training through placements on research teams, where they can contribute meaningfully to project outcomes. Similarly, each year, one eligible intern may apply to receive a scholarship valued at \$2,500 to support their studies. This competitive award may be held for up to four years.



PARTNERSHIP UPDATE

2020 – 2021 presented significant challenges to partner integration, since most external partners restricted access. In the WRDSB, for example, we lost access to classroom testing for our video game prototype and could not obtain ethics clearance to work with students. Similarly, as our external corporate partners shifted to remote work and closed their offices, and as universities moved online, it became impractical to embed HQP within workplaces. Nonetheless, we found some telling opportunities for partner engagement.



Sara Fontes

First, HQP Sara Fontes (Toronto) conducted a detailed needs-analysis for our new partner, Kent County Council (KCC). Under the supervision of partner representatives Paul Cuming and Casper Johnson, she surveyed digital ecosystems deployed by museums and archives in the UK and US. She then prepared an extensive white paper that plots potential avenues of exploration for KCC as the agency seeks to update its digital offerings in the coming years. Sara’s work was made more exceptional by the fact that she operated remotely, from Canada, and did not have physical access to KCC facilities.

Second, HQP Owais Hamid (Waterloo) developed a prototype algorithm to gather biometric data from museum visitors via a camera and Raspberry PI. The tool can be deployed in museum settings, for example, to track how long visitors spend at each exhibit, where they move during a visit, and in what order they pass through galleries. All biometric data is anonymized and no personal identifiers are retained, allowing museums to gather aggregate data without compromising visitor privacy. It is hoped that Owais’ prototype may be deployed for testing in Year 3 through our new Partner, TheMUSEUM, in downtown Kitchener.



Owais Hamid

Third, ongoing COVID-19 restrictions prevented once again our Summer Archaeology Field School at Herstonceux Castle. EOC partner, the BISC, instead worked collaboratively with project executives to develop a virtual archaeology course in which team member Amelia Fairman led limited excavations remotely while students in Canada participate virtually. Three BA HQP from Waterloo participated in the pilot program and delivered conference papers on their individual research projects.

CONGRATULATIONS

Faced with unprecedented adversity and daunting challenges, it seems more important than ever to offer congratulations to our colleagues on their professional successes. Some important career milestones we celebrated together in Year 2 include:



Zack MacDonald

Zack MacDonald, formerly Assistant Librarian at St. Jerome's University in the University of Waterloo and our team's Digital Librarian began a tenure-track position at Western University as Map Librarian – Special Collections. Zack continues to engage actively with a number of our research teams, offering his expertise in 3D modelling, GIS, and mapping. He also continues to mentor our HQP in those areas.

Jane Tingley, who presented the first materialization of her EOC-sponsored artwork *Foresta-Inclusive* at the Contemporary Art Forum Kitchener and Area (CAFKA), left the University of Waterloo to accept a position as Associate Professor at York University, Toronto. There she refines practice-based computational arts for the engagement of climate crisis. CBC Arts reported that "Jane Tingley uses a dazzling constellation of data to empathize with the experience of other living beings."



Andrew Moore

Andrew Moore, EOC Research Facilitator, completed his doctoral dissertation entitled "Manorial Regulation and Negotiation in a Late Medieval Environment: Land and Community at Herstmonceux, 1308 – 1440," which explores the complex relationship between the people who managed the estate and their natural surroundings. Andrew's defence will take place in September 2021. In 2020 – 2021, Andrew also: designed a new online course for the DRAGEN Lab, to be offered through the University of Waterloo and St. Jerome's University, on Medieval Monsters; was instrumental in obtaining a SSHRC Connection Grant to support our upcoming EOC Symposium (see below!); made important contributions to a multi-authored chapter on EOC's pedagogical video game; and co-authored with the EOC Director an article on aquatic management in late medieval Sussex that was accepted for publication to *Speculum: the Journal of the Medieval Academy of America*.

And, finally, **Ann Marie Rasmussen**, the Rt. Hon. John G. Diefenbaker Professor of German Literary Studies at Waterloo, completed the page proofs for her long-anticipated monograph *Medieval Badges: Their Wearers and Their Worlds*, a study of these brooch-like objects worn throughout the Middle Ages. The book appears through the University of Pennsylvania Press this fall and will fast become essential reading for any student or scholar interested in the history of material culture. In 2020 – 2021, Ann Marie's colleagues and former students also published a festschrift, a collection of essays in her honor, entitled *Gender Bonds, Gender Binds: Women, Men, and Family in Middle High German Literature. Essays in Honor of Ann Marie Rasmussen*.

NOTICE OF EOC SYMPOSIUM

Adaptation and Resilience: Past, Present, and Future Environments, which benefits from a SSHRC Connection Grant and directly supports many of the themes of EOC, takes place **Saturday, 7 May 2022 at the University of Waterloo**. The symposium presents several panels in which an historian, a scientist, and a policy maker or public commentator engage in discussions on Climate Change, Food Availability, Water Management, and Contagious Disease. Richard Hoffmann offers opening remarks. Registration details will appear on medieval-environment.com.

NOTICE OF ANNUAL GENERAL MEETING

Pandemic permitting, the AGM will take place **April 8 – 10 2022 at Herstmonceux Castle, East Sussex**.

All collaborators, co-investigators, partner reps, and eligible HQP should mark their calendars and plan to attend.

