Paul Celicourt

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Education

Post-doctoral Researcher, Soil Science and Agri-Food Engineering 2020
Faculty of Agriculture and Food Sciences
Laval University— Quebec City, Quebec, Canada

Ph.D., Water Resources and Environmental Engineering (Hydroinformatics) 2017
The City College of New York – New York, NY

Master of Science, Urban Sustainability 2011
The City College of New York – New York, NY

Bachelor of Science, Electromechanical Engineering 2009
Faculté des Sciences, Université d'Etat d'Haïti – Port-au-Prince, Haïti

Experience

Co-Founder & Senior Research Scientist Dec 2016 to Present
SENSAQ Startup (www.sensaq.com**)**— Syosset, NY

- Completed the requirements, design and architecture for a sensor-to-data-dissemination environmental data acquisition and cyberinfrastructure system named **Integrated Sensor Data Management System** (ISDMS). It is an extension of my PhD thesis work into a commercial product (hardware and software) intended to simplify the processes of collecting field data, capturing the deployment context metadata, annotating the data with the captured metadata and ultimately delivering the annotated data to end users in standardized formats. The system enhances the ability of both humans and machines to automatically discovers, uses and reuses the data.
- Completed initial schematics design for an innovative sensor platform named TranscodX with built-in support for metadata storage and processing. Assisted in manufacturing-schematics revision and testing of TranscodX.
- Completed a Linux-based Operating System distribution for TranscodX using the Yocto project.
- Completed several Python-based packages to support the deployment and operation of TranscodX as a stand-alone or networked (using ZigBee) device.
- Designed and developed **TCAST** and TCAST Application Programming Interface (API) to support the capture of TranscodX deployment context metadata, TranscodX auto-programming based on sensors attached and the encoding (using the IEEE 1451.0 and WaterML standards), transfer and storage of the provided metadata to TranscodX.
- Developed a Virtual TranscodX that emulates the full process of configuring and programming of TranscodX using TCAST. It is available at: https://tcast.sensaq.com/tcast/virtualtranscoder/
- Developed a desktop application connected to the TCAST API using the Electron Framework as a bridge between TranscodX and the TCAST engine.
- Developed a Sensor Information System to support the ability for TCAST to automatically generate a program to control and collect data from sensors attached to TranscodX.
- Designed and developed an API for TranscodX to submit captured metadata and data into a cyberinfrastructure environment for data management and curation purposes.
- Designed and developed the **TranscoNet** web application based on the Django Web Framework (Python) to create virtual networks of TranscodX and also specify data publication options with users.
- Designed and developed the **DataVault** application to permit the access to both private and public data in the system.

- Designed and developed the **HydroUnits** application, a measurement units processing tool that is coupled to **DataVault**, to support the retrieval of the data in user's preferred unit system.
- Introduced ISDMS as speaker or exhibitor at various international scientific conferences.

Graduate Research Assistant Jan 2012 to Dec 2016
The City College Of New York – New York, NY
Water Resources Assessment in Haiti and Dominican Republic
Responsible for deploying hydrometeorological stations (3 piezometers and 2 weather stations) in Leogane (Haiti), two piezometers in Lake Azuei (Haiti) and Lake Enriquillo (Dominican Republic) and a meteorological station in Jimani (Dominican Republic). Automate the transmission of the in-situ data collected via satellite or cellular data network to a web server. Developed software components to automatically download and process the streaming data files before loading into the CUAHSI Observations Data Model (ODM). Scientific Leader of the Bathymetric Survey for Lake Azuei in Haiti.

Evaluation of Channel Bed Stability in Rouyonne River under Hurricane Sandy, Leogane, Haiti
Used the Aquaveo, LLC's Watershed Modelling System (WMS) to automate watershed delineation task, create the centerline and the banks of the channel, and extract channel cross-sections from a Light Detection and Ranging (LiDAR)-based Digital Elevation Model (DEM) data. Used the HEC-1 Flood Hydrograph package to simulate Rainfall-Runoff processes based on precipitation, land use and soil type data. Used HEC-RAS to compute bed and overbanks shear stress, wetted perimeter and stream power from the HEC-1 and WMS results. Used WMS as a HEC-RAS post-processing tool to simulate geometric and flow data for two reaches and a tributary of the Rouyonne River.

Trans-African Hydro-Meteorological Observatory (TAHMO), Kenya, Africa
Developed software components to automatically harvest and process the streaming data from the sensor network. Implement data management infrastructures to allow proper storage and free access to the Trans-African Hydro-Meteorological Observatory (TAHMO) data collected. Communicated with partners at Oregon State University and GeoSysNet which implemented a customized data portal for data visualization.

Algorithms and Cyberinfrastructure for High-Precision Automated Quality Control of Hydro-Meteorological Sensor Networks, New York, NY
Responsible for developing software components to process datasets from the Oklahoma MESONET Earth Networks “WeatherBug network” the Andrews Long-Term Ecological Network sites and TAHMO network before uploading them into an instance of the CUAHSI ODM database using the Streaming Data Loader tool. Travel occasionally throughout the United States of America for scientific group meetings and participate remotely in bi-weekly meeting. Participate in the design and development of an open-source standards-compliant software system named SENSOR-DX that implements automated data quality control.

National Energy-Water System Assessment Framework (NEWS): Stage I Development Grant, New York, NY
Developed the data management infrastructure to support stand-alone models so that team members can access, archive and withdraw data as needed. Integrated into the NEWS framework a capacity to enable automatic updates of data and new data uploads. Created support documentation for all the data management routines and systems put in place. Communicated with partners at the University of New Hampshire and support their efforts on the design and execution of the some of the foundational computer codes associated with the NEWS framework.

Teaching Assistant Jan 2014 to Dec 2016
The City College Of New York – New York, NY

ENGRG 59910: Introduction to GIS
Conducted laboratory sessions, guides, monitored and graded the lab assignments and their grading for the courses. Held regular office hours and attendance sheets, addressed the concerns of students in a responsible manner, and acted as liaison between the instructor and students. Presented the lecture in the absence of the course instructor.

Teaching Assistant Sep 2008 to Aug 2010
Faculté des Sciences, Université d'Etat d'Haïti – Port-au-Prince, Haïti
Provided tutorials for students taking undergraduate level Physics courses. Participated in exam supervision and grading. Conducted study and review sessions, and acted as liaison between the instructor and students.

Awards

1. City University of New York's Environmental CrossRoads Initiative Fellowship, 2012-2017.
2. Research Foundation of the City University of New York (RFCUNY) fellow student, 2010-2011.
3. Association des Ingenieurs Haitiens et Americains (ADIHA)'s Gerard Marc Scholarship, December 2015.
4. PowerUp Kreyol! Business Plan Competition, October 2016.
5. IEEE Region 9 Foundation Humanitarian, Research and Development Grant, December 2014.
6. Career and Professional Development Institute (CPDI) Student Professional Development Grant (The City College of New York), March 2014.

Publications

Celicourt, P., Rousseau, A. N., Gumiere, S. J. (2020). Agricultural hydroinformatics: An emerging framework for implementing and adopting information technologies to foster the sustainable management of water in farming systems. *Biosystems Engineering*. *In preparation*.

Celicourt, P., Etienne E., Sam, R. and Piasecki, M. (2020). Integrating Metadata and Controlled Vocabularies in in-situ Earth Observing Instrumentations: Beyond dataloggers' capabilities to streamline the sensor-to-data-curation process. *In preparation*.

Bredy, J, Gallichand, J., **Celicourt, P.**, Gumiere, S. J. (2019). Water table depth forecasting in cranberry fields using two decision-tree-modeling approaches. *Agricultural Water Management*. *Under review*.

Celicourt, P., Sam, R. and Piasecki, M. (2019). Rapid Prototyping of an Automated Sensor-to-Server Environmental Data Acquisition System. *Journal of Environmental Informatics*. *Under Revision*.

Celicourt, P. and M. Piasecki (2015). HydroUnits: Supporting Dimensional Analysis in Hydrologic Computing Systems using Sensor-based Standards. Special Issue on Online Water Data Networks: methods, standards, tools, and technologies. *Journal of Hydroinformatics*.

Celicourt P., Sam R., Piasecki M. (2016). Development of a Wireless Environmental Data Acquisition Prototype: An Experience Report. *Journal of Software Engineering and Applications*. October 2016, 9, pp479-490.

Celicourt P., Piasecki M. (2015). An IEEE 1451.0-based Platform Independent TEDS Creator using Open Source Components. *International Journal of Sensors and Sensor Networks*, Vol.3, No.1, March 2015.

Conference Proceedings and Abstracts

Celicourt, P., Sam, R. and Piasecki, M. (2017). Hydromet Sensing: the next generation sensor-to-data management system using open source technologies (*Invited*). Society for Freshwater Science Conference, Abstract No. 6063. Raleigh, NC, USA, June 4-8, 2017.

Celicourt, P., Sam, R. and Piasecki, M. (2016). Towards a cross-platform software framework to support end-to-end hydrometeorological sensor network deployment. AGU Fall Meeting Abstracts, Abstract No: IN23D-1792. San Francisco, CA, December 12-16, 2016.

Celicourt, P. and Piasecki, M. (2015). HydroUnits: A Python-based Physical Units Management Tool in Hydrologic Computing Systems. American Geophysical Union, Fall Meeting 2015, Abstract No: IN11C-1788. San Francisco, CA, December 14-18, 2015.

Piasecki, M. and **Celicourt, P.** (2015). Towards a Software Framework to Support Deployment of Low Cost End-to-End Hydroclimatological Sensor Network. American Geophysical Union, Fall Meeting 2015, Abstract No: H23G-1654. San Francisco, CA, December 14-18, 2015.

Prousevitch A., Corsi, F., Glidden, S., Piasecki, M., **Celicourt, P.**, Miara, A., Fekete, B. M., Vorosmarty, C. J., Macknick, J. and Cohen, S. M. (2015). Data Management System for the National Energy-Water System (NEWS) Assessment Framework. American Geophysical Union, Fall Meeting 2015, Abstract No: GC31E-1233. San Francisco, CA, December 14-18, 2015.

Vorosmarty, C. J., Miara, A., Rosenzweig, B., Corsi, F., Piasecki, M., **Celicourt, P.**, Fekete, B. M., Macknick, J., Melillo, J. M., Newmark, R. L., Tidwell, V. C., Suh, S. and Prousevitch A. (2015). Overview of the National Energy-Water System (NEWS) Assessment Framework Study. American Geophysical Union, Fall Meeting 2015, Abstract No: GC34D-04. San Francisco, CA, December 14-18, 2015.

Celicourt, P. and M. Piasecki (2015). Towards a Sensor-to-End-User Ambient Data Acquisition System. 2015 Bloomberg Data for Good Exchange Conference. New York, NY, September 28, 2015.

Celicourt, P. and M. Piasecki (2014). Hydrometeorological Data Collection, Publication and Analysis using Open-Source Hardware and Software. In: 11th International Conference on Hydroinformatics, New York, NY, USA, August 17-21, 2014.

Celicourt, P and Piasecki, M. (2014). An End-to-End System to Enable Quick, Easy and Inexpensive Deployment of Hydrometeorological Stations. American Geophysical Union, Fall Meeting 2014, vol 1, pp. 1190. San Francisco, CA, December 15-19, 2014.

Oral Presentations

Celicourt, P., Etienne, E., Sam, R. Gedeon N., and Piasecki, M. (2019). Crossing a new frontier in hydrometeorological data management with an Integrated Sensor Data Management System (ISDMS). MOXXI Conference 2019: Measurements and Observations in the 21st Century, New York, NY, USA. March 11-13, 2019.

Celicourt, P., Etienne, E., Sam, R. Gedeon N., and Piasecki, M. (2018). An Integrated Sensor Data Management System with Application in Hydrology. American Geophysical Union, Fall Meeting 2018, Abstract No: H51E-01. Washington, DC, USA. December 10-14, 2018.

Celicourt, P. (2018). An Integrated Sensor Data Management System. Australian Research Data Commons 2018 Monthly Tech Talk in November: Environmental Sensor Data (QA/QC). Online.

Celicourt, P., Sam, R. and Piasecki, M. (2017). TranscodX: A Generation of Full Stack Environmental Data. IAHS Measurements and Observations in the XXI Century (MOXXI) and WMO Hydrohub Joint Meeting (Innovation in Hydrometry: from ideas to operation). WMO Headquarters, Geneva, Switzerland, December 4-5, 2017.

Patents

Celicourt, P. (2016). Integration of Transducer Data Collection. Location: U.S. Patent and Trademark Office. Application No. 15,362,937, filed November 29, 2016.

Celicourt, P. (2018). Transducer Programmer. Location: U.S. Patent and Trademark Office. Application No. 15,983,931, filed May 18, 2018.

Professional Affiliations

- Member, Canadian Geophysical Union
- Member, Canadian Water Resources Association
- Member, American Geophysical Union
- Member, Association des Ingénieurs Haïtiens et Américains (ADIHA)
- Member, International Association of Hydrological Sciences (IAHS)
- Member, IAHS-MOXXI: Measurements and Observations in the 21st Century
- Member, EnviroSensing Cluster of the Federation of Earth Science Information Partners

Computer Skills

Computer Programming Languages	**:** Python, C, C++, C#, CRBasic.
Operating System Development	: Yocto Project
Version Control System Software	: git
Database Server	: MySQL, MSSQL, SQLite, PostgreSQL/PostGIS
GIS & Hydrologic Modelling Software	: ESRI's ArcGIS, MODFLOW, HEC-RAS, HEC-HMS
Web Programming and Frameworks	: Django, Tastypie, Electron, PHP, JavaScript.
Scientific Data and File Formats	: NetCDF, WaterML.

Professional and Scientific Services

Manuscripts reviewer for:

- Journal of Hydroinformatics (2013-present)
- IEEE Software Magazine (2016-present)
- International Journal of Advanced Computer Science and Applications (2016-present)
- IWA Open Water Journal (2016-present)
- International Journal of Sensors and Sensor Networks (2015-present)
- Conference Proceedings on Scientific Computing with Python (2017-present)

Languages

- English
- French
- Haitian Creole