EUROPEAN UNIVERSITY ASSOCIATION

2021 EUROPEAN LEARNING & TEACHING FORUM
EMBEDDING AND FACILITATING SUSTAINABILITY
ONLINE
18-19 FEBRUARY 2021 (HALF DAYS)

ABSTRACT PROPOSAL FORM
Deadline for submission: 13 October 2020

Author(s)

Name: **Edward J. Coyle** ***(Presenter)***
Position: **John B. Peatman Distinguished Professor of Electrical and Computer Engineering, Georgia Research Alliance Eminent Scholar, and Director, Vertically Integrated Projects Program**
Organisation: **Georgia Institute of Technology**
Country: **United States of America**
E-mail address: ejc@gatech.edu

Short bio (150 words max):

Ed Coyle founded the Vertically Integrated Projects (VIP) Program, which integrates research and education by embedding large-scale, long-term teams of undergraduates in the research efforts of faculty and their graduate students. He chairs the VIP Consortium, a nonprofit alliance of 40+ universities that have VIP programs and work together to improve, evaluate, and disseminate the VIP model. Among his awards and recognitions, Dr. Coyle was co-recipient of the U.S. National Academy of Engineering's Bernard M. Gordon Prize for Innovation in Engineering and Technology Education and was elected a Fellow of the Institute of Electrical and Electronics Engineers for contributions to the theory of nonlinear signal processing. His current research interests include systemic reform of higher education, signal and information processing, and wireless and sensor networks. He received a B.S. in Electrical Engineering from the University of Delaware, and master's and Ph.D. in Electrical Engineering and Computer Science from Princeton University.

Name: **Stephen Marshall** ***(Presenter)***
Position: **Professor and Director, Vertically Integrated Projects Programme for Sustainable Development (VIP4SD)**
Organisation: **University of Strathclyde**
Country: **Scotland, UK**
E-mail address: stephen.marshall@strath.ac.uk

Short bio (150 words max):

Prof Stephen Marshall received a first class honours degree in Electrical and Electronic Engineering from the University of Nottingham and a PhD in Image Processing from University of Strathclyde. He has published over 200 conference and journal papers. He is a Fellow of the Institution of Engineering and Technology (IET) and a Senior member of the IEEE. He has also been successful in obtaining research funding from National, International and Industrial sources. These sources include EPSRC, EU, BBSRC, NERC and Innovate UK.

Stephen Marshall established the Vertically Integrated Project Program at Strathclyde in 2012. This brings together multidisciplinary teams of undergraduates to work with staff and researchers on long term projects. Since 2016 he has worked closely with Dr Scott Strachan to align the VIP program with the UN Sustainable development goals as VIP4SD. The program won the International Green Gown award for student engagement in 2020.

Additional Authors (Not Presenting)

Name: **Brigita Dalecka**
Position: **VIP activity coordinator and researcher**
Organisation: **Riga Technical University**
Country: **Latvia**
E-mail address: **brigita.dalecka_1@rtu.lv**
Short bio (150 words max):
Since 2019 Brigita Dalecka has been VIP coordinator at Riga Technical University's Design Factory. She is also a Ph.D. candidate and researcher at Riga Technical University (Latvia, Riga) and KTH Royal Institute of Technology (Sweden, Stockholm). Currently, Brigita Dalecka is continuing to develop a doctoral thesis on wastewater treatment from hazardous substances using the fungal approach. Parallel to her Ph.D. project, she is coordinating the VIP activity binding together RTU professors and students. The main aim of this activity is to develop and implement new innovations in the science field. Brigita believes that VIP activity can give new input on student cooperation with science and new knowledge and experience in student learning.

Name: **Maria Engberg**
Position: **Associate Professor**
Organisation: **Malmö University**
Country: **Sweden**
E-mail address: **Maria.engberg@mau.se**
Short bio (150 words max):
Engberg is Associate Professor at Department of Computer Science and Media Technology, Malmö University, and an Affiliate Researcher at the Augmented Environments Lab at Georgia Institute of Technology (US). She is the Director of the research program Data Society (2019-2023), devoted to the study of datafication and digitalisation as change agents in contemporary society. Engberg's research interests include digital aesthetics, digital media studies, and processes of digitalisation and datafication and their impact on culture, organisation and media forms. Engberg researches and designs mobile media experiences for augmented and mixed reality (AR/MR) for cultural heritage and informal learning experiences. She leads the VIP program at Malmö University and has received several university grants to support its development. The VIP program is currently established at two of the university's five faculties with plans for teams starting next year in two more faculties.

Name: **Ian Smith**
Position: **Associate Dean (Education) Arts and Divinity**
Organisation: **University of St. Andrews**
Country: **Scotland, UK**
E-mail address: **assocdeanarts-education@st-andrews.ac.uk**
Short bio (150 words max):
Trained as an economist at the University of Cambridge, Ian has taught economics at St Andrews throughout his academic career. His research field is the application of econometric methods to social questions including education. He has served as Director of Teaching in the School of Economics & Finance and in roles as Pro Dean and Associate Dean of the Staff of Arts and Divinity. Ian pioneered the introduction of Vertically Integrated Projects at St Andrews in 2020.

Proposal

Title: Linking Research, Education, and Professional Skills: Vertically Integrated Projects at 4 Institutions

Proposal (maximum of 800 words):

Since 2017, EUA thematic peer groups have called on institutions and networks to link research and teaching (2017), to promote active learning (2018), and to incorporate these and professional skills development into the curriculum (2019 and 2020). Four EUA institutions (University of Strathclyde; Malmö University; Riga Technical University; University of St Andrews) have answered these calls, achieving instructional, curricular, and institutional change through Vertically Integrated Projects (VIP) Programs. These institutions have also come together as learning organizations to share and leverage lessons learnt.

The VIP model solves challenges in research-based learning by engaging students in the research projects of their professors. Through VIP, large multidisciplinary student teams are embedded in academic scholarship and exploration. Vertical integration refers to the inclusion of second, third and fourth-year students, along with graduate students, post-doctoral researchers, and academic staff. Projects are long-term, spanning many years, and students can participate for multiple terms. This allows returning students to become leaders within their teams, enabling long-term disciplinary and professional growth. As new students join, they are inducted and brought up to speed on complex projects, just as new employees are in the workplace. At the same time, students maintain documentation for future use by their team, again as in the workplace. At every level of participation, from onboarding to leadership, **students build professional skills in a meaningful context**, working collaboratively, strengthening communication skills, and practicing conflict resolution while working in community with university researchers.

A challenge to research-based education is project identification. Student-conceived projects require staff supervision, but staff engagement may be limited if the projects do not contribute to their research. Courses that simulate research experiences require time and resources to develop, and these settings involve less meaningful student-staff engagement. In contrast, VIP Projects are embedded in ongoing staff research. The vertically integrated structure, long-term nature, large size, and multidisciplinary composition of VIP teams enables them to make significant contributions to staff scholarship and research efforts. **These features cultivate long-term staff engagement, which is key to the programme's sustainability and scalability.**

We will profile VIP Programmes at four European institutions, which collectively enrol 275 students in 32 teams. While all of these programmes follow the VIP model, each implementation is unique.

- The University of Strathclyde is the oldest VIP Programme in Europe, established in 2012, and it enrols 120 students in 16 VIP teams. Strathclyde's VIP4SD programme is organized around the UN Sustainable Development Goals, and the programme won the International Green Gown award for student engagement in 2020.

- Malmö University established its VIP Programme in 2019 and enrols 50 students in 5 VIP teams. From its earliest stages, the programme crossed disciplinary lines, with early leadership from the Faculty of Technology and Society and the Faculty of Culture and Society.

- The VIP Programme at Riga Technical University in Latvia was established in 2017, and now enrols 78 students in 7 VIP teams. The Riga programme is organised around the RTU Design Factory, which provides knowledge in engineering design, skills in technology prototyping, and availability of

equipment. Additionally, the programme provides scholarships to students who participate in VIP, showing a meaningful investment in the programme and their students.

- The University of St. Andrews VIP programme was launched this year. It is the first in the world to be initiated primarily within the Humanities, with an impressive launch of 5 teams and 27 students. The programme is already growing and expanding into other disciplines.

Many lessons have been learnt across these four institutions. Programmes faced challenges in establishing new courses that are unlike any other because teams are multidisciplinary, and learning outcomes are loosely defined and vary by VIP team and student major. These **challenges were largely overcome through the multi-institution community**, with administrators learning from other VIP institutions, observing students and staff in VIP team meetings, and understanding the way in which the experience fits within other universities' curricula.

Beyond a European community of practice, the four profiled institutions are involved in the VIP Consortium of 40 institutions from 11 countries. Through the Consortium, VIP programme directors share effective practices and learn from each other in areas such as faculty professional development, curricular integration, and multi-institution projects. The four profiled European institutions have presented at the annual VIP Consortium meeting, authored collaborative papers, and served as examples to prospective institutions including National University of Ireland Galway, Riga Stradins University, and the University of Bath.

Target audience:
The presentation will be of interest to principals/rectors, vice-rectors/vice-principals for academic affairs, deans, and department chairs. Because VIP has been implemented in a wide variety of institutions, including large and small, public and private, the model will be of interest to a broad audience.