Introduction

Learning tools is fun, but it's only the beginning. The next step is harnessing Computational BIM to build script-driven design strategies that give you an advantage in practice. In this session we will feature inspiring speakers who have done just that. Computational design leaders will tell exciting stories about what they have been able to do with computational design tools. This year our talks will largely focus on topics related to machine learning that are becoming more and more critical to the AEC industry. We hope that you will take away new ideas from this session that will help get you started with what you've learned today and inspire you to augment your design processes.

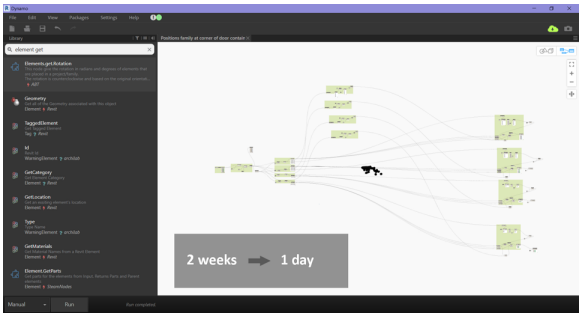
Lilli Smith, Sr. Product Manager for AEC Generative Design at Autodesk who has worked for the last several years on making computational design tools accessible to more users will introduce the speakers with a few brief remarks about computational design at Autodesk. **Katya Veleva** will kick off our talks by discussing everyday use of Dynamo in the construction stage of a project. **Shawnee Finlayson** will talk about how to achieve structured, good quality data which is critical for machine learning workflows. **Efrie Escott** will then talk to us about how machine learning is being leveraged to improve the understanding of the built environment at Kieran Timberlake. Next our developer workshop leaders will briefly share their **Dynamo Extensions** – what, why and how in a quick share out. Finally, **Luke Church** will close out the Forum with an inspiring look at how machine learning can be used for humanitarian purposes and suggest implications for other domains, such as the built environment.

Schedule

3:30-3:40 **Introduction: Computational Design at Autodesk** Lilli Smith
3:40-4:00 **Every Day Dynamo** Katya Veleva
4:00-4:20 **Preparing for Machine Learning Using Dynamo!** Shawnee Finlayson
4:20-4:40 **Data and Design Machine Learning in Practice** Efrie Escott

4:40-5:00 **Extensions Workshop Share out**
5:00-5:20 **Humane Engagement with Machine Learning** Luke Church
5:20-5:30 **Closing Remarks** Lilli Smith
5:30-6:30 Discuss over drinks

Forum Talks



Every Day Dynamo
Katya Veleva, Associate BIM Strategy Consultant, Archilizer

Visual programming? Does this seem like someone else's job? Do you think that's just that thing the new kids in the corner of the office do for bids and competitions? Or does it look just too difficult and overwhelming? This talk is looking to show the everyday use of Dynamo in a construction stage of a project and how easy and rewarding it can be to make the first steps with creating some basic graphs handling data. Gradually we will reach graphs that deal with mass family positioning. In conclusion, we will compare timelines of manual work and the conception and execution of automated processes – the result? Well, spoiler alert – traditional methods are not the hero of this story!

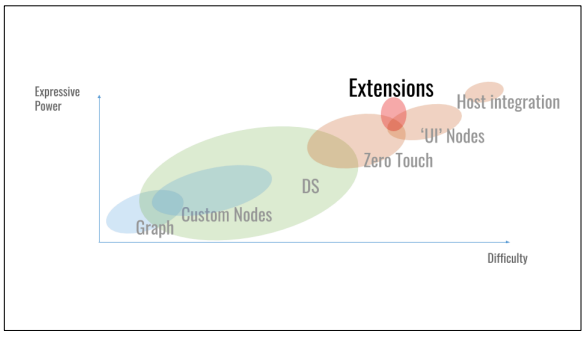
Preparing for Machine Learning Using Dynamo!
Shawnee Finlayson, Design Technology Coordinator, BVN

The AEC industry has begun to embrace the transformative potential of machine learning in their workflows. However, implementing machine learning requires

structured, good quality data within our models and project environments. This talk will explore the use of computational design tools, such as Dynamo, to clean up Revit model data and perform QA checks to ensure there is a consistent dataset within each project and across all of the projects within an organization. We will also touch on using automated batch processing systems to complete these tasks on multiple models at the same time. Using these workflows is not only an integral step towards the preparation for machine learning, it is also an enjoyable way to speed up and improve the accuracy of internal processes, resulting in a better and more integrated model solution for our projects.

Data and Design Machine Learning In Practice
Efrie Escott, Kieran Timberlake

How is Machine Learning being leveraged to improve the design process in AEC? How can designers start to explore machine learning on their own? Explore these questions with KieranTimberlake's Efrie Escott as she dives into the opportunities for machine learning to increase user comfort and efficiency of design. She will illustrate the broader topics with examples of work leveraging machine learning to improve design communication and to increase building performance, highlighting the challenge of data collection within AEC and methods for identifying appropriate data types within AEC workflows.



Dynamo Extensions Workshop Share Out
Racel Williams, Michael Kirschner, Andreas Dieckmann, John Pierson, Eric Rudisaile,, Sol Amour, Radu Gidei, Mark Thorley, Matteo Cominetti, Long Nguyen, Adam Sheather

Ever felt like you wanted Dynamo to do more? Maybe you want to create another window to track workspace utilization? Or you want to create a drawing tool inside of

Dynamo? Extensions are a powerful development tool in the Dynamo ecosystem that allow customers to extend Dynamo beyond its out of the box capabilities. They allow for developers to drive custom functionality based on Dynamo interactions and logic. Extensions are becoming easier to create and distribute than ever before with new documentation available and the introduction of their support on the Package Manager. This year at AU, we held our first-ever Computational BIM Developer Workshop where attendees learned how to build an extension from scratch through hands-on training sessions with some of the top Dynamo Developers from around the world. Each session had a specific theme that they were focused around:

1. **View Extensions for C# Beginners - CBW227909 -** Andreas Dieckmann, John Pierson
2. **Build Custom User Interfaces and Interactions for Dynamo - CBW227910 -** Eric Rudisale, Sol Amour
3. **Control Dynamo from the Web - CBW227911 -** Radu Gidei, Mark Thorley
4. **Leveraging Speckle in Dynamo - CBW227912 -** Matteo Cominetti
5. **Custom Graphics Visualization and User Interaction in the Dynamo Viewport - CBW227913 -** Long Nguyen, Adam Sheather

Humane Engagement with Machine Learning
Luke Church, Lark Systems

Machine learning and artificial intelligence can feel like a Faustian pact - in exchange for seemingly magical increases in expressive capability, we have traded control over our computers and their role in society. In this talk I explore an alternative: humane engagement with machine learning. I describe work using ML and AI techniques to help construct new forms of democratic representation in Kenya and Somalia. We seek to amplify, rather than automate, social scientists who are giving a voice to citizens in humanitarian interventions. I highlight lessons learnt along the way about how to build ML and AI systems that achieve more humane properties and suggest implications for other domains, such as the built environment.

Speakers

Lilli Smith, AIA, Sr. Product Manager, Autodesk Inc.
Lilli is an architect with a passion for re-envisioning the way that buildings are designed and constructed. After working for several years as an architect, she joined Revit Technology as a fledgling start up and helped grow it to where it is today in almost every architect's toolbox. She has gone on to work on many Autodesk tools including Vasari, FormIt, Dynamo, Quantum and Project Fractal. Her most recent focus is on Project Refinery: Multi Objective Optimization and Optioneering for Dynamo.

Katya Veleva, Associate BIM Strategy Consultant, Archilizer
Katya is a thinker, not a clicker. With her work, she aims to clear architectural design and modelling of dull and repetitive tasks so that designers can dedicate all their resources to what they do best – design. Katya has 5 years of architectural experience in various international architectural practices. She has worked in the Residential and Sports sectors but her most significant experience has been in Healthcare. Healthcare, arguably the sector with the highest and most advanced BIM standards was what drove her into a consultancy career. Katya has always been deeply involved with the learning and development in her workplace and has additional experience as a personal tutor. She is a patient and a listening teacher, who believes that any architectural software is easy and anyone can learn to use at its fullest potential given the right help. In her spare time, Katya can be seen performing stand-up comedy across open mics in London.

Shawnee Finlayson, Design Technology Coordinator, BVN
Shawnee is a National Design Technology Coordinator at BVN Architecture. As a self-professed nerd she has a growing passion for implementing data-driven design processes on projects and using data analysis and visualization to showcase their advantages. During her 7 years in the Arup Building Structures Team she continually pushed the limits of their software and practices by implementing parametric workflows on a vast range of exciting projects using Dynamo and Grasshopper. It was here that she developed an insatiable need to automate the boring tasks associated with day-to-day activities and she continues to feed this hunger for efficiency at BVN. By combining technology research, data analysis and visualization, she hopes to establish new data driven design workflows that will have a substantial and positive impact on BVN's projects.

Efrie Escott, Kieran Timberlake
Efrie Escott (AIA, LEED AP BD+C) explores topics related to materials, Life Cycle Analysis, digital technologies, and environmental systems as a member of the Research Group at KieranTimberlake. She works with design teams to translate data-driven research into architectural design. Efrie uses her experience with computer programming and digital analysis methods to lead the BIM Practices group, working to integrate novel digital and analog analysis practices with traditional BIM. She is a member of the award-winning development team for Tally, a BIM-integrated tool to measure environmental impacts and the founder of Philadelphia's Dynamo User Group. She teaches digital analysis and design at the University of Pennsylvania and Temple University. Before joining KieranTimberlake, Efrie studied architecture and theoretical physics at Yale College prior to receiving a Master of Architecture from the University of Michigan and a Master of Environmental Management from Yale University.

Racel Williams, Sr. UX Designer/Product Owner, Dynamo, Autodesk Inc.
Racel Williams is a Senior UX Designer with a B.S. in Marketing from the University of Florida and Master's degrees in Architecture and Human-Computer Interaction from Georgia Tech where her research focus was Augmented Reality and Tangible Interaction. As a Research Scientist at Georgia Tech, her role was to design, implement, and test AR and Tangible prototypes. In 2013, she joined Autodesk as an intern where she carried over her academic experience to design, implement, and test a mobile AR prototype for in-situ annotation and visualization. She now is a Product Owner/User Experience Designer for Dynamo, an open-source visual scripting program, that allows customers to generate algorithms to create geometry, automate tasks, and even control robots, without needing to know how to code.

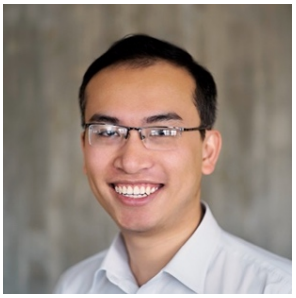
Michael Kirschner, Full-Stack Developer, Dynamo, Autodesk Inc.
Michael Kirschner is a graduate of MIT's Design Computation group where his work included a new visual programming language. He currently works as a software engineer with the Autodesk Dynamo team. His background is in Architecture and 3d graphics technology. He has lead workshops at CAAD Futures, Facades Plus, and Smart Geometry.

Andreas Dieckmann, GmbH
Andreas Dieckmann is a Berlin-based licensed architect, who works as a BIM & Computation Technologist for gmp Architekten (von Gerkan Marg & Partner), one of Germany's largest architectural offices. Since 2011 he has been speaking regularly at conferences like AU and RTC. An early adopter of Dynamo, he is the author and co-author of several popular Dynamo packages - first and foremost of Clockwork, currently one of the three most frequently downloaded Dynamo packages. Andreas is a Revit Gunslinger, a member of the Bad Monkeys and participates in the Autodesk Expert Elite program.

Eric Rudisaile, Microdesk
Eric Rudisaile is a Revit expert and Dynamo junkie. He started out as a mechanical designer for large buildings including hi-rise residential, theaters, libraries and labs then his passion for process and BIM made him want to make his own tools. He now knows Python, Dynamo, C#, and enough JS to be dangerous. Now at Microdesk Eric spends his time automating workflows for specific projects, or creating custom apps for clients in the AEC industry. He is the brain parent of DynaFire; shortcuts for Dynamo.

Radu Gidei, Design Tech
As Development Lead for design technology consultancy designtech, Radu works closely with teams of architects, engineers, contractors and clients to improve digital design delivery through custom workflows, bespoke tools and new web-based platforms. He sees his role at designtech as the perfect application of his highly rational & analytical thinking stemming from a background in programming and unencumbered creativity, courtesy of being trained & working as an architect. Radu has also been teaching computational design in Dynamo and Revit at the Canterbury School of Architecture for both undergraduate and postgraduate courses for the past 5 years and is a committee member for the UK Dynamo User Group. In his spare time, Radu plays electric guitar and makes Dynamo packages like DynaWeb or the machine-learning enabling AI package.

Mateo Cominetti, Arup
Matteo is a Senior Automation Developer at Arup where he helps drive the global automation and digital design implementation. Matteo works closely with the engineering teams to bring new technologies to the existing design processes and built environment. Possessing a multidisciplinary background in architecture, engineering, and software development, he focuses on enhancing BIM, virtual design and construction, parametric design and open standards. Matteo has previously worked at Foster + Partners in the Applied Research and Development team, at WeWork in the Building Intelligence team and at CASE to deliver cutting edge solutions for projects and software tools. Matteo is also author of several open source applications which deal with data exchange, issue tracking and automation.



Long Nguyen, University of Stuttgart
Long Nguyen is a computer scientist with special interests in Computational Design, Generative Architecture, Computer Graphics, Digital Photography and lightsabers. Previously graduated from the University of Cambridge and currently based at the University of Stuttgart, Long is a very active researcher and lecturer in Computational Design. He has a passion for promoting computational design within the AEC industry and especially the BIM community. He develops tools for the Revit/Dynamo platform, as well as Rhino/Grasshopper. His main languages are English, Vietnamese, C++, C# and Python

Luke Church, Lark Systems
Luke works to improve the experience that people have with socio-technical systems, including programming languages, AI platforms, buildings, public policy and humanitarian interventions. His work is practice-led and incorporates methods from philosophy, computer science, psychology and critical design. In 2018 he founded Lark Systems to explore ways of integrating different forms of intelligence.