



DATA INITIATIVE 2020

A Year in Review



Northeastern
D'Amore-McKim School of Business

DATA Initiative

DATA MAKES ANALYTICS HAPPEN

The **Digital, Analytics, Technology and Automation (DATA) Initiative** connects with students, faculty and companies to deploy effective solutions and develop new approaches to solving problems.

THE DATA INITIATIVE

The Digital, Automation, Technology and Analytics (DATA) Initiative at Northeastern University has had an incredible year connecting organizations, faculty, and students.

Our goal is to enable **digital transformation**. From advancing research to disseminating knowledge, each activity advances the latest perspectives. Through keeping alongside trends across industries and disciplines, DATA aims to be the top-of-mind resource for Northeastern partners who seek to be at the forefront of a world being changed through technology and data.

This year we hosted our **annual data forum** virtually for the first time as well as welcomed two cohorts of the analytics lab to work on key projects within our community. These events are

featured in this annual report. With a growing network of affiliated researchers across all colleges, rising student engagement and deepening collaborations with NU partner organizations, the DATA Initiative is poised for an outstanding 2021.



MEDIA RESOURCE LAUNCHED

This year DATA launched a new website to host newly created multimedia content.

The website hosts all information about some of our newest stories and features.

Visit <https://data-initiative.com> for more information.

MEDIA

This year we released the **DATA Initiative Podcast** to keep our listeners engaged with all things analytics in our community. These podcasts range from topics to help students find their careers in analytics to discussing day to day subjects revolving the growth of analytics in our lives.

In addition to our podcasts, we have conducted numerous research studies and interviews to keep our audience updated and engaged on trends in analytics.



EP 1: Welcome to the DATA Initiative

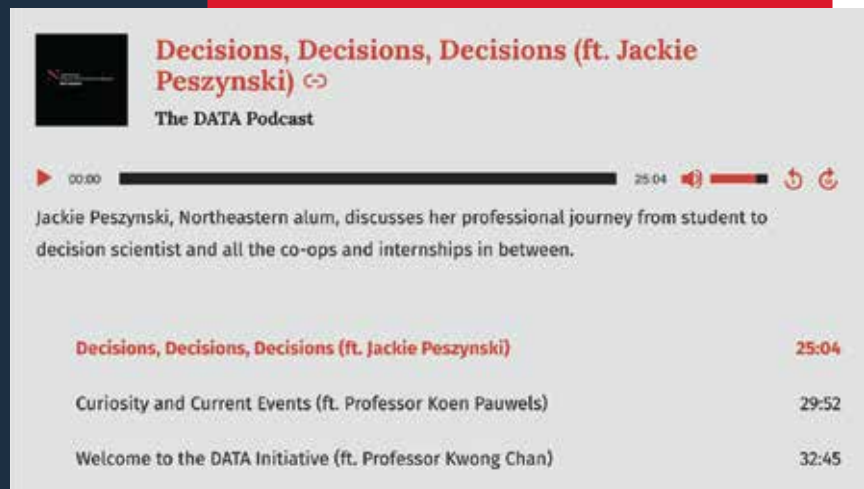

DATA Initiative's Executive Director Kwong Chan introduces listeners to the growing organization and its many branches to drive student, faculty, and company involvement.

EP 2: Curiosity and Current Events

Distinguished Professor Koen Pauwels introduces listeners to quantitative research and provides his take on United Airlines' decision to eliminate change fees for good.

EP 3: Decisions, Decisions, Decisions

Jackie Peszynski, Northeastern alum, discusses her professional journey from student to decision scientist and all the co-ops and internships in between.



Decisions, Decisions, Decisions (ft. Jackie Peszynski) ↻
The DATA Podcast

00:00 25:04 🔊 🔁 ↺

Jackie Peszynski, Northeastern alum, discusses her professional journey from student to decision scientist and all the co-ops and internships in between.

Decisions, Decisions, Decisions (ft. Jackie Peszynski)	25:04
Curiosity and Current Events (ft. Professor Koen Pauwels)	29:52
Welcome to the DATA Initiative (ft. Professor Kwong Chan)	32:45

The future of business is in data.

Explore featured research publications from Dr. Pauwels and Dr. Bart, co-founders of the DATA Initiative, to learn more about data in marketing, AI implementation, digital transformation.

Digital transformation: A multidisciplinary reflection and research agenda

Peter C. Verhoef, Yakov Bart, et. al.

As digital transformation affects vast swathes of the economy, consumers' altered expectations and behaviors put further strain on traditional firms in the market. Dr. Bart et. al. define three stages for digital transformation: digitization, digitalization, and digital transformation. Besides describing the process of business transformation, the need for accompanying metrics is also highlighted. In an increasingly digital world, documenting transformation strategies has never been more pertinent.

Informational Challenges in Omnichannel Marketing: Remedies and Future Research

Tony Haitao Cui, Koen Pauwels, et. al.

Omnichannel marketing has been viewed as a cure-all for one-to-one marketing, however, this research highlights the challenges of this technique. Among them, data access and integration marketing attribution, and consumer privacy protection. Advances in machines learning promise solutions to these problems, although new technologies promise new challenges alongside them.

Multiple Time Series Analysis for organizational research

Anatoli Colicev, Koen Pauwels

This research argues that multiple time-series analysis (MTSA) blends well with organizational research. The applications of MTSA include social media, innovation, management teams, and others. Besides highlighting key methodologies for this research technique, software tutorials in both R and STATA are provided. Lastly, Facebook and private business reputation data are combined to employ this approach.

Dynamic Resource Allocation on Multi-Category Two-Sided Platforms

Hui Li, Qiaowei Shen, Yakov Bart

Platform businesses are typically resource-intensive and must scale up their business quickly in the early stage to compete successfully against fast-emerging rivals. This research proposes optimal resource allocation strategies for such organizations. By differentiating between platforms that charge on a per-user basis from those that charge per-transaction, an optimal framework is proposed.

Brave New World? On AI and the Management of Customer Relationships

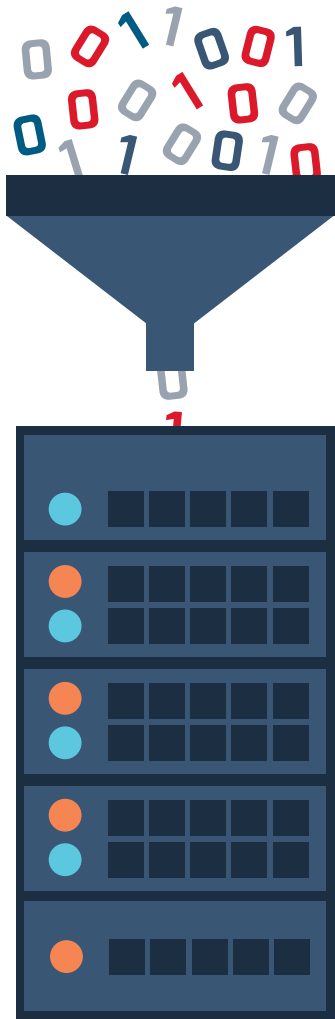
Barak Libai, Yakov Bart, et. al.

Artificial intelligence is the future, however, whether that future is utopian or dystopian is still to be perceived. Among its various applications, AI in sales software has become rampant. Customer relationship management (CRM) is a critical component of a company's ability to sell and market its products. This research identifies AI-CRM's greater ability to predict customer lifetime value and its expected implications of its emergence.

How CEO/CMO characteristics affect innovation and stock returns: findings and future directions

Ya You, Koen Pauwels, et. al.

The authors propose how CEO characteristics can influence innovation and stock returns. While investors are motivated by cash flow expectations-in particular, the prospect of increasing and accelerating future cash flows, reducing associated risks, and increasing residual value-chosen business strategies flow from leadership's opinions. This research outlines the personality, demographics, experience, and compensation of upper management and suggests future research on CMO characteristics.



Enduring Attitudes and Contextual Interest: When and Why Attitude Surveys Still Matter in the Online Consumer Decision Journey

Koen Pauwels, Bernadette van Ewijk

Understanding the Consumer Decision Journey is a key interest for managers across markets. This article conveys added benefit from the employment of both surveys and online behavior analysis. Both methodologies are then related, showing how and why they offer complementary information to managers. Based on managers' goals' time horizons, the proposed framework aids in the assessment of these metrics.

Social Media's Impact on the Consumer Mindset: When to Use Which Sentiment Extraction Tool?

Raoul V. Kubler, Anatoli Colicev, Koen Pauwels

This research defines two forms of sentiment extraction tools (SETs); bottom-up machine learning based approaches and top-down dictionary based techniques. Defining sentiment from user-generated content can be used to predict traditional mindset metrics like Awareness, Consideration, and Satisfaction. Pauwels and colleagues convey the benefits of each form of SET in relation to the strength of the brand hoping to employ the techniques.

Yakov Bart
Associate Professor, Marketing



RISE DATA INITIATIVE COMPETITION

RISE, the Research, Innovation, Scholarship and Entrepreneurial Expo, was born a decade ago, as a showcase for the research and creative projects being undertaken by Northeastern's solution-focused, leading-edge students, faculty, and staff. In 2019, DATA Initiative has established a new RISE Focus Award "Creating Value with DATA" for recognizing projects demonstrating the most inventive and promising approach to creating value with data-driven and technology-enabled analytics and automation. In 2020, we have received over 20 high-quality submissions.



RESearch
Innovation
Scholarship
Entrepreneurship

2020 Award Winner
Creating Value with DATA
Freida Parsons – *Multi-Level Sentiment Analysis of Stress*

300+ ATTENDEES

7 GUEST SPEAKERS

2020 DATA FORUM

On November 16, Schneider Electric and the Northeastern University DATA Initiative co-presented the second annual DATA Forum. This year, the focus was on “Building a Sustainable and Resilient Future.” Thought leaders from Deloitte, PwC, Schneider Electric, and Suffolk Construction convened to speak in various virtual sessions.

“What AI Does for You, What Do You Do for AI?”, moderated by **Professor Ruth Aguilera**, featured:

Robert Bernard, Director of Artificial Intelligence at PwC

Tami Frankenfield, Managing Director, Data, Analytics and Cognitive at Deloitte

Jim Rowan, Principal, Analytics and Cognitive at Deloitte

Cyril Perducat, Executive Vice President IoT & Digital Offers at Schneider Electric





Rob, Tami, Jim and Cyril shared their experiences working in the artificial intelligence industry.

“Women Leaders in Analytics”, moderated by **Dean Carla Brodley**, featured:

Chris Leong, Chief Marketing Officer at Schneider Electric

Jit Kee Chin, Chief Data and Innovation Officer at Suffolk Construction

Chris and Jit Kee discussed their experiences as women working in the analytics field and their entrance into the industry.

Chris Leong led the Keynote session: **“Building a Sustainable & Resilient Future.”**

Chris provided her perspective on the importance for companies to practice corporate social responsibility and explained how Schneider Electric currently implements

these practices in their mission to provide energy for all.

“We believe digitization in sustainability and efficiency will bring about solutions” explained Chris in response to the biggest challenge facing society right now, climate change. Outside of the DATA Forum, Schneider Electric has collaborated with the lab to develop advanced analytics methods. Chris hopes that through this partnership, Schneider Electric will be able to continue leveraging student “talent to deliver even more ambitious solutions.”



“Schneider Electric’s purpose is to empower all to make the most of our energy and resources, bridging progress and sustainability for all. At Schneider, we call this Life Is On.”

STUDENTS IN DATA



Melissa Soong, DMSB '21, is working towards her bachelor's in business administration at Northeastern University's D'Amore-McKim School of Business with a concentration in marketing analytics. She is the project manager for the DATA Initiative and works closely with the Analytics Lab.

Q. What are some organizations on campus that have helped you learn more about data analytics?

I started working with the DATA Initiative, a cross-disciplinary hub that shares new knowledge in data analytics. Over the past year, I have worked with the DATA Club in promotion of analytics on campus, helped establish the first student Analytics Lab, and organized the inaugural DATA Forum last September, which brought in guest speakers from leaders in the industry.

These initiatives have given both undergraduate and graduate students the opportunities to learn more about analytics and connect with projects or companies to promote learning.

Q. What is one of your favorite school projects you have worked on?

I took the Introductory data science course this past semester and created a mock predictive model for Yelp. The goal was to help recommend cuisines to potential business owners by looking at trending successful businesses in a given state. What I liked about this project was the ability to

connect real-world problems with programming and my new technical skills in Python! This dataset gave my partner and me a lot of interesting information, and we became really invested in it.

Aldo Pioline Anthony Charles, KCS '22, is working towards his master's in data science at Northeastern University's Khoury College of Computer Sciences. Outside of the classroom, he is the expert in residence for the DATA Initiative and serves as a resource for students working on analytics projects in the Analytics Lab.



Q. What are some of the key challenges you faced during any work projects or working in the industry?

Any cool project can flop when you do not build the right infrastructure to sustain its “coolness.” We always face the need to improve our data pipelines and other parts of our engineer-

ing infrastructure such as a need for a faster database, a better algorithmic complexity, etc. to keep improving our product and handle the millions of API requests we had coming in every day. Keeping a product stale without any update is a sign of its depreciation.

Q. How important do you see the offset between business understanding vs software engineering in the field of data science?

Business understanding is essential. When you really need data science to solve a business problem, software engineering comes in handy to build the right algorithms that are efficient and use the right tools to cater to the needs for an accurate solution, especially when the data science solution is an actual software or an API which needs to serve the results quickly and efficiently.



INSIDE THE LAB

The DATA Analytics Research Lab matches a select group of students in data science and analytics with high-impact company challenges.

The lab is cross-disciplinary with an emphasis on addressing real-world challenges.

We invite expressions of interest that provide an opportunity for teams to use analytical skills to solve high-impact problems. Direct engagement with students is a further benefit where companies can get to meet their talent pool directly and where students receive direct exposure to industry professionals.

Organizations are expected to cover any costs associated with the project, but there is no fee for working with the DATA Analytics Research Lab. Send all inquiries to contact@datanu.org.



Kwong Chan
*Associate Academic Specialist, Marketing;
Executive Director, DATA Initiative*

STUDENT TESTIMONIALS

"I improved my technical and analytical skills because of the intensity of the Lab as well as my course load featuring Foundations of Data Science and Information Presentation and Visualizations. Now, I am comfortable in my ability to bring value to clients."

— Alex Shaw

"The DATA initiative analytics lab was transformational to help me understand data analytics in a deeper sense... It is a way of thinking and solving problems using analysis and critical thinking."

— Yash Jain

"The diversity of thought provided by students of different majors enhanced my overall experience. I learned much more during in-class discussions because my peers were able to provide new perspectives to discussion topics... each group member complimented one other because of our various strengths."

— Alissa Chen

"Once I started a data science project for another class, I realized how much I learned through this independent study. I was able to make visualizations with ease, I knew what data to analyze, and I felt more comfortable using machine learning models."

— Chris Hadler



Spring 2020 students had the opportunity to work on projects with HubSpot, DraftKings and Schneider Electric.

"...be to be ready to learn. The lab was far more different than what I initially expected coming in. If I were to describe what I learned in the lab it would be a mix of conceptual learning as well as hands-on experience through the form of case studies, workshops, and working with clients."

— *Jonathan Hsin*

"During my three months with the lab, I have learned the basics of data science, common problems with data, how to build models, and how to present to clients."

— *Gary Shetye*

"We hit the ground running by completing social and behavioral research training for certification. By ensuring that we know how to conduct research correctly and ethically, the DATA lab provided knowledge and a tangible skill that transcends beyond just this semester or class."

— *Tiffany Luo*

"The DATA Initiative Analytics Research Lab provided me with a fantastic opportunity to partake in projects related to the data science field. From my lab experience, I learned how to be an effective collaborator, apply data science principles, and identify and solve business problems by analyzing data."

— *Shivangi Sood*

"...this course has reminded me that with a little time you can learn a lot, try something new, gain a new perspective."

— *Kurt Dean*

Fall 2020 students worked on accelerating web presence analysis and audit through UX recommendations as well as Mavrck image recognition and social media projects for Youtube, TikTok and Instagram.

2020 AWARDS

Teaching Innovation Award:
Professors Kwong Chan, Koen Pauwels and **Yakov Bart** received a Teaching Innovation Award for the Analytics Lab

3 Professors from the DATA Initiative at Northeastern D'Amore-McKim School of Business ranked as world's top 2% scientists in 2020 Stanford Study: Professors **Nada Sanders, Koen Pauwels**, and **David Lazer**



*Koen Pauwels
Distinguished Professor, Marketing*

“The Digital, Analytics, Technology and Automation Initiative is enabling a generation of intellectual leadership in the areas of digital convergence.”

WHAT'S NEXT?



1

CO-OP OPPORTUNITIES

DATA is prototyping a new type of Co-op where leading DATA Faculty work with companies to hire students who have a strong focus in analytics and data science. DATA's support of data competitions, analytics curriculum and research, enables for identification of students most suited to analytical Co-ops.



2

GROWTH

The Research Lab has more than doubled in size from 12 to 30 members in a year. The current lab includes Graduate and Undergraduate students working challenges ranging from automatic content recognition to bias identification in law enforcement.



3

ANALYTICS CHALLENGE SERIES

In 2021 companies have agreed to offer a series of challenges to enable students to showcase their data science skills with top entries receiving prize money and a day with the sponsoring company's analytics team.



Digital, Analytics, Technology & Automation

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