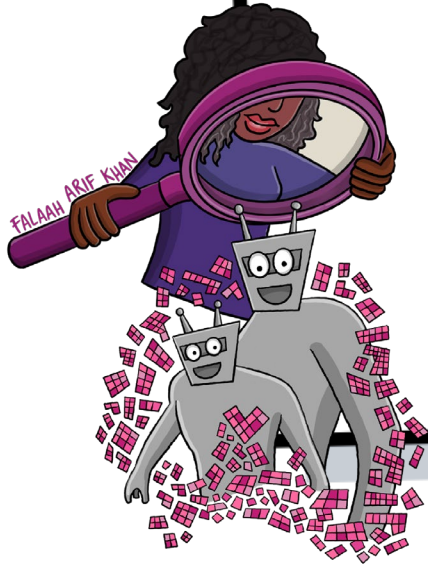# Introduction to transparency

Julia Stoyanovich
New York University

r/ai

center
for
responsible
ai

http://r-ai.co

Responsible AI by example

Welcome to the fastMRI Dataset

NYU Langone Health

About Us

Here at the Center for Advanced Imaging Innovation and Research (CAI²R), in the Department of Radiology at NYU School of Medicine and NYU Langone Health, we bring people together to create new ways of seeing. We are committed to the translation of new imaging techniques and technologies into clinical practice, for the improvement of human health. In particular, we are pushing the boundaries of rapid image acquisition and advanced image reconstruction, with the aim of providing uniquely valuable biomedical information to advance the understanding of disease and improve the care of patients.

fastMRI

We are partnering with Facebook AI Research (FAIR) on fastMRI – a collaborative research project to investigate the use of AI to make MRI scans up to 10X faster.

NYU Langone and FAIR are providing open-source AI models, baselines, and evaluation metrics.
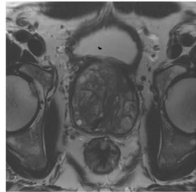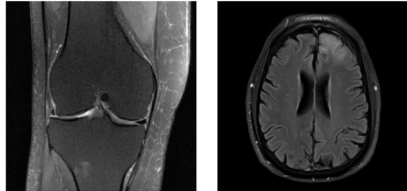
The Dataset

The deidentified imaging dataset provided by NYU Langone comprises raw k-space data in several sub-dataset groups. Curation of these data are part of an IRB approved study. Raw and DICOM data have been deidentified via conversion to the vendor-neutral ISMRMD format and the RSNA clinical trial processor, respectively. We also performed manual inspection of each DICOM image for the presence of any unexpected protected health information (PHI), with spot checking of both metadata and image content.

Knee MRI: Data from more than 1,500 fully sampled knee MRIs obtained on 3 and 1.5 Tesla magnets and DICOM images from 10,000 clinical knee MRIs also obtained at 3 or 1.5 Tesla. The raw dataset includes coronal proton density-weighted images with and without fat suppression. The DICOM dataset contains coronal proton density-weighted with and without fat suppression, axial proton density-weighted with fat suppression, sagittal proton density, and sagittal T2-weighted with fat suppression. The exact distribution of contrasts is given in **table 1**. Please note that this table does not include stats about the data that was originally held back for the fastMRI reconstruction challenge.

Apply for Access

The application process includes acceptance of the Data Sharing Agreement (found below) and submission of an online application form. The application must include the investigator's institutional affiliation and the proposed uses of the data. NYU fastMRI data may be used for internal research or educational purposes only as described in the data use agreement and may not be redistributed in any way without prior permission. Read and agree to the data use agreement below to apply for access.
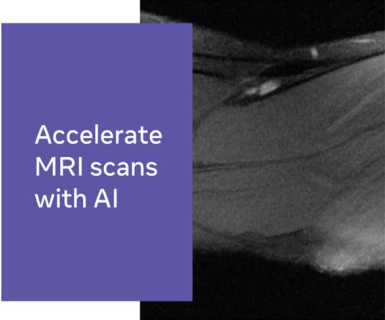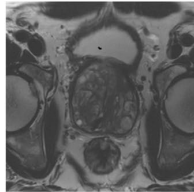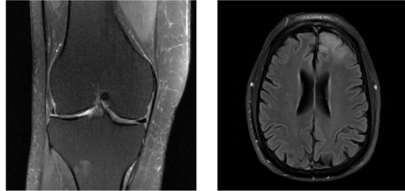
clear need for improvement

can validate quality / usefulness

technical readiness

decision-maker readiness

∞ Meta

fastMRI

AI at Meta and NYU Langone Health demonstrate that AI can generate accurate MRIs using one-fourth of the raw data traditionally required for a full MRI.

Accelerate MRI scans with AI

r/ai center for responsible ai

https://fastmri.med.nyu.edu/

Responsible AI by example: are we done?

Welcome to the fastMRI Dataset

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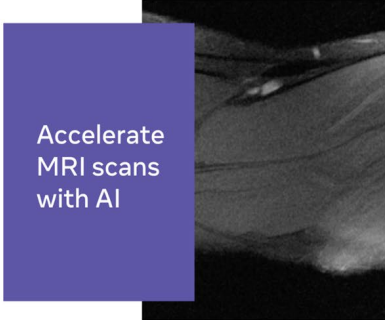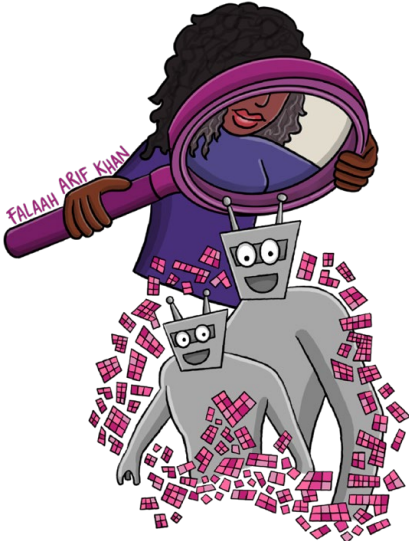
- clear need for improvement
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r/ai center for responsible ai
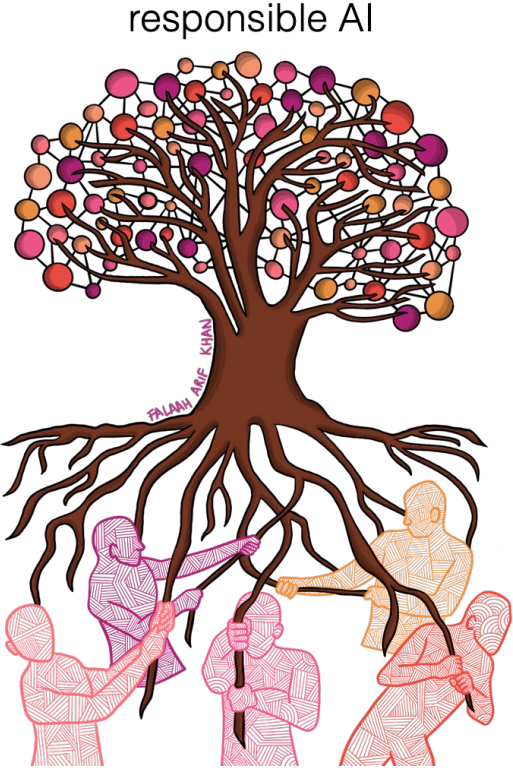
https://fastmri.med.nyu.edu/

Terminology & vision

transparency, interpretability,
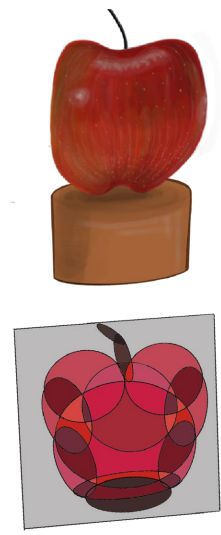explainability, intelligibility

responsible AI
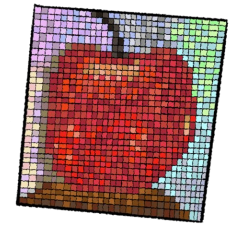
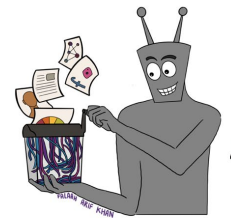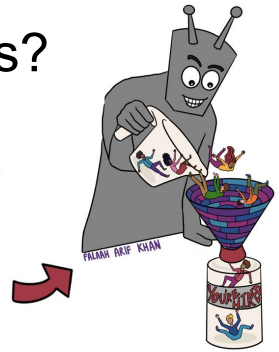agency, responsibility

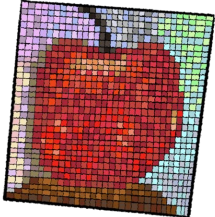# Transparency: of what?

data?

model?

process?

Challenge: transparency through the lifecycle
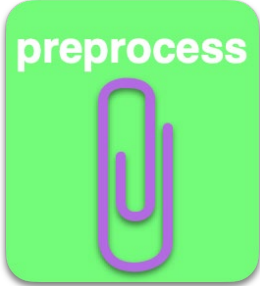

data?

model?

process?

Example: taming technical bias

Goal: design a model to predict appropriate level of compensation for job applicants

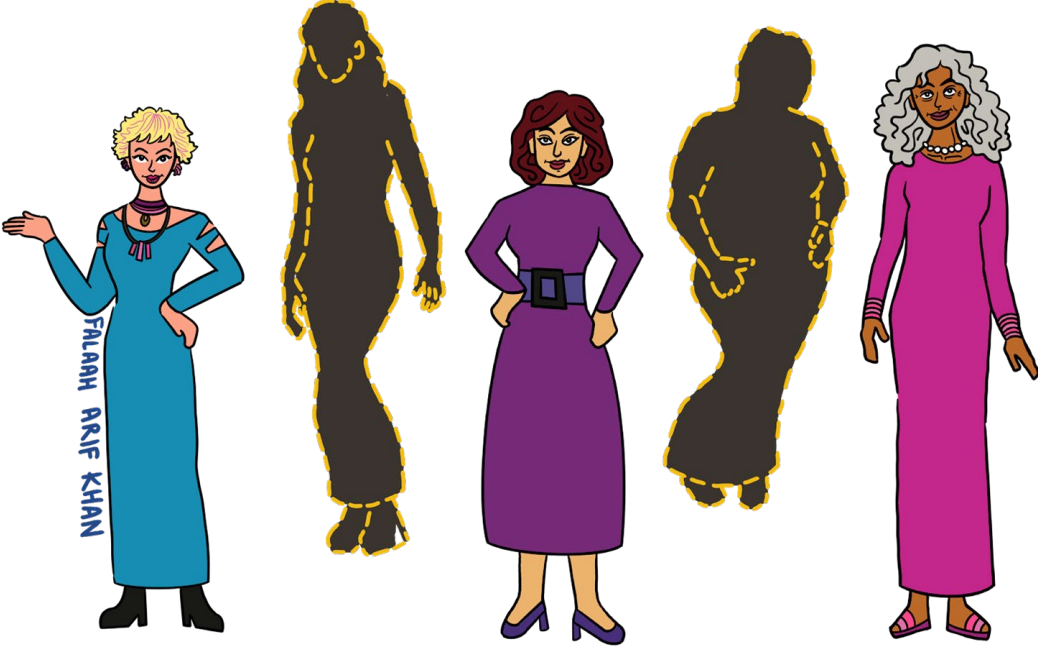**Problem** : accuracy is lower for women who have more experience on the job - a fairness concern

[Schelter,He,Khilnani, Stoyanovich, 2020]

Missing values: observed

Missing value imputation

are values **missing at random** (e.g., *gender, age, years of experience, disability status* on job applications)?

are we ever interpolating **rare categories** (e.g., *Native American*)

are **all categories** represented (e.g., *non-binary gender*)?

r/ai center for responsible ai
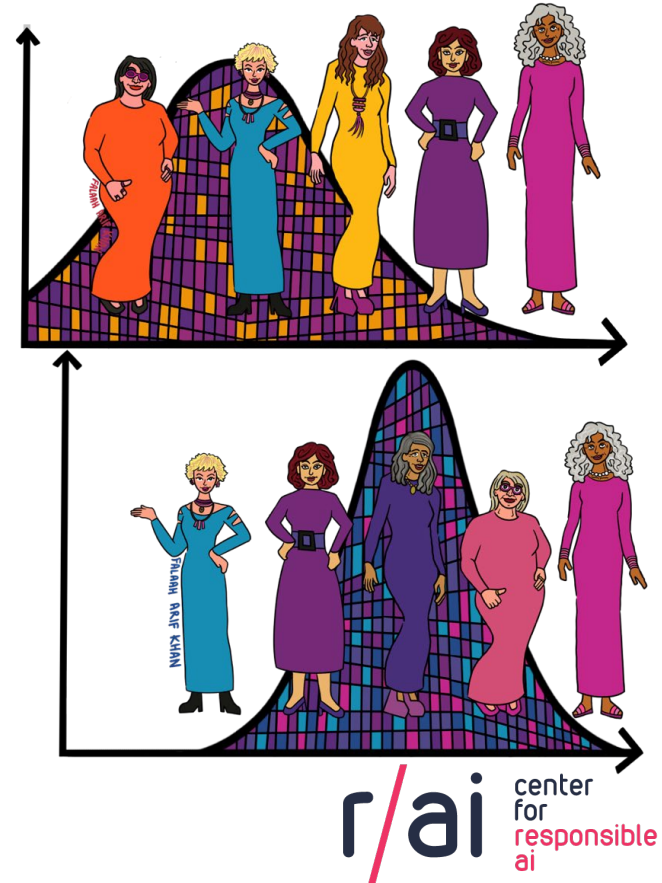
Data filtering

operations like **selection** and **join** , can arbitrarily change demographic group proportions
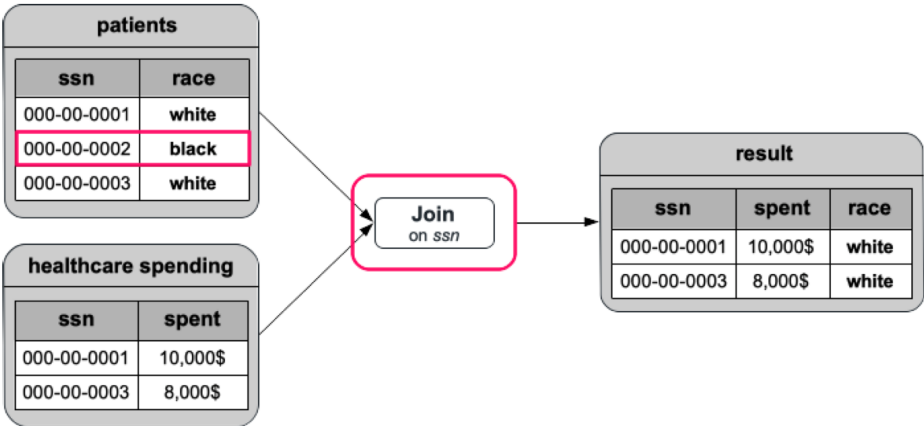
age_group	county
60	CountyA
60	CountyA
20	CountyA
60	CountyB
20	CountyB
20	CountyB

→

age_group	county
60	CountyA
60	CountyA
20	CountyA

50% vs 50%   66% vs 33%

patients

ssn	race
000-00-0001	white
000-00-0002	black
000-00-0003	white

healthcare spending

ssn	spent
000-00-0001	10,000$
000-00-0003	8,000$

Join
on *ssn*

result

ssn	spent	race
000-00-0001	10,000$	white
000-00-0003	8,000$	white

Data distribution labels

[Grafberger, Stoyanovich & Schelter 2021]

Transparency: for whom and why?
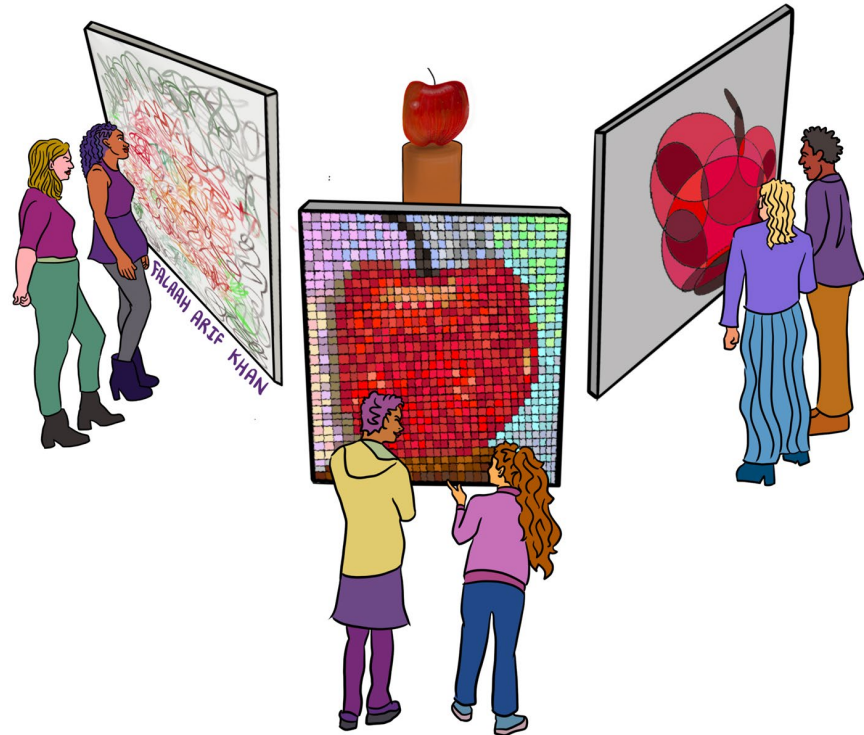
To **whom** are we explaining?

Why / for what purpose?

Are explanations effective?

FALAAH ARIF KHAN

r/ai center for responsible ai

The "nutritional labels" metaphor

SIDE-BY-SIDE COMPARISON

Original Label   **New Label**

Nutrition Facts
Serving Size 2/3 cup (55g)
Servings Per Container About 8

Amount Per Serving	
Calories 230	Calories from Fat 72

	% Daily Value*
Total Fat 8g	12%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	12%
Dietary Fiber 4g	16%
Sugars 1g	
Protein 3g	
Vitamin A	10%
Vitamin C	8%
Calcium	20%
Iron	45%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Nutrition Facts
8 servings per container
Serving size   2/3 cup (55g)

Amount per serving	
Calories	**230**

	% Daily Value*
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Note: The images above are meant for illustrative purposes to show how the new Nutrition Facts label might look compared to the old label. Both labels represent fictional products. When the original hypothetical label was developed in 2014 (the image on the left-hand side), added sugars was not yet proposed so the "original" label shows 1g of sugar as an example. The image created for the "new" label (shown on the right-hand side) lists 12g total sugar and 10g added sugar to give an example of how added sugars would be broken out with a % Daily Value.

An example of the old nutrition labels, left, and the new one. The new nutrition labels will display calories and serving size more prominently, and include added sugars for the first time.
PHOTO: FOOD AND DRUG ADMINISTRATION/ASSOCIATED PRESS

https://www.wsj.com/articles/why-the-labels-on-your-food-are-changing-or-

ACCOUNTANT
Acme Partners

Qualifications:	BS in accounting, GPA >3.0, Knowledge of financial and accounting systems and applications
Personal data to be analyzed:	An AI program could be used to review and analyze the applicant's personal data online, including LinkedIn profile, social media accounts and credit score.
Additional assessment:	AI-assisted personality scoring

ALERT: Applicants for this position DO NOT have the option to selectively decline use of AI analysis for any of their personal data or to review and challenge the results of such analysis.

https://www.wsj.com/articles/hiring-job-candidates-ai-11632244313

Security & Privacy Overview
Smart Device Co.   ①

Smart Video Doorbell NS200
Firmware version: 2.5.1 - updated on: 11/12/2020
The device was manufactured in: China

Security Mechanisms ②

Security updates	Automatic - Available until at least 1/1/2022	
Access control	Password - Factory default - User changeable, Multi-factor authentication, Multiple user accounts are allowed	

Data Practices ③

	Visual	Audio	Physiological	Location
Sensor data collection				
Sensor type	Camera	Microphone		
Purpose	Providing device functions	Providing device functions, Research		
Data stored on device	Identified	No device storage		
Data stored on cloud	Identified	Identified - Option to delete		
Shared with	Manufacturer, Government	Manufacturer		
Sold to	Not disclosed	Not sold		
Other collected data	Motion, Account info, Payment info, Contact info, Device setup info, Device tech info, Device usage info			
Privacy policy	www.NS200.smartdeviceco.com/policy			

More Information ④

Detailed Security & Privacy Label:
www.iotsecurityprivacy.org/labels

CMU IoT Security and Privacy Label **CISPL 1.0** iotsecurityprivacy.org   **PUBLIC DOMAIN**

https://www.wsj.com/articles/imagine-a-nutrition-labelfor-

r/ai center for responsible ai
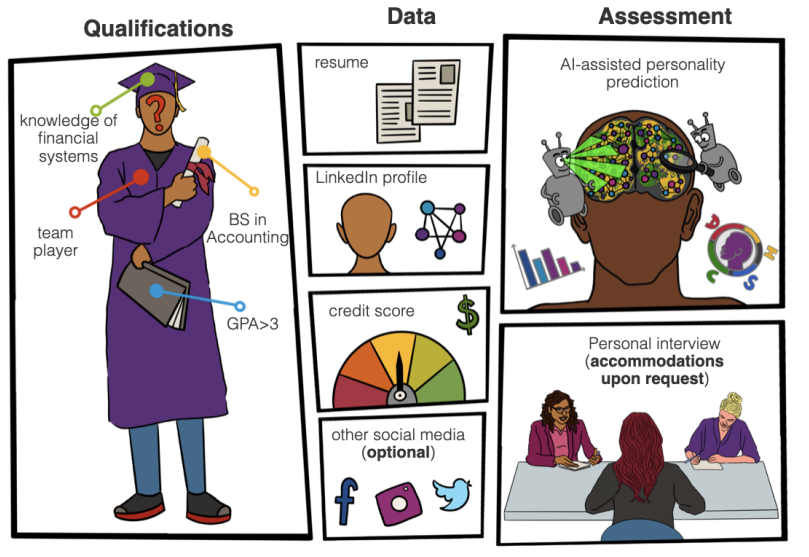
Nutritional labels for data & models

comprehensible : short, simple, clear

consultative : providing actionable info

comparable : implying a standard

also….

incrementally computable , as a by-product of multi-step computation

[Stoyanovich & Howe 2019]

Challenge: transparency that "works"

References & acknowledgements

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Data Distribution Debugging in Machine Learning Pipelines, VLDB Journal, 2022 https://doi.org/10.1007/s00778-021-00726-w

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Nutritional Labels for Data and Models, IEEE Data Engineering Bulletin, 2019 http://sites.computer.org/debull/A19sept/p13.pdf

HV Jagadish

Bill Howe

Oded Nov
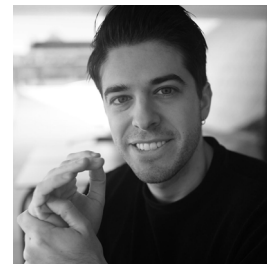
Andrew Bell

r/ai center for responsible ai

ALGORITHMIC TRANSPARENCY PLAYBOOK

APR 2023

A stakeholder-first approach to creating transparency for your organization's algorithms.

Andrew Bell
Julia Stoyanovich, Ph.D.
Oded Nov, Ph.D.

Thank you!
Questions?

Julia Stoyanovich
New York University, USA