



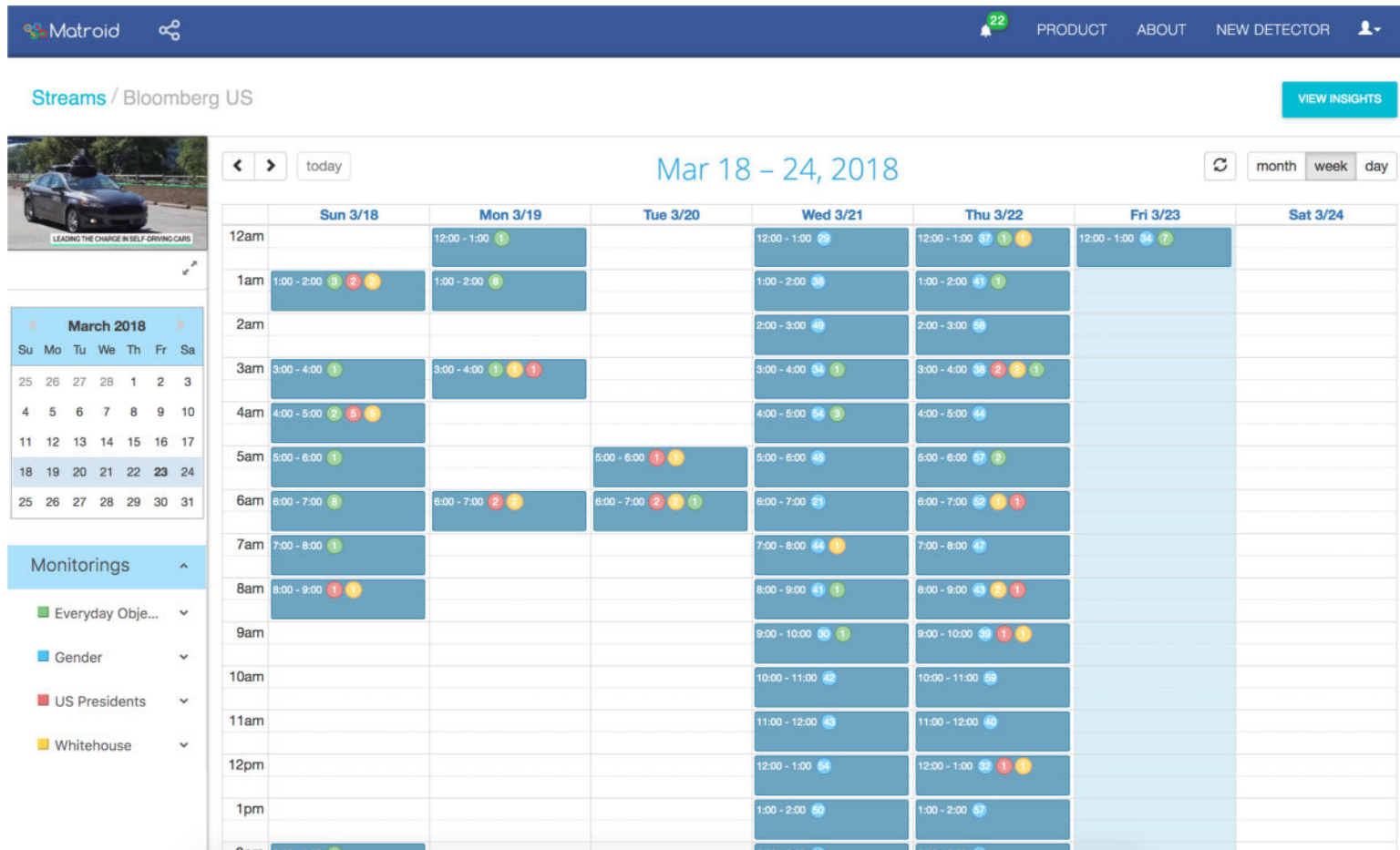
Computer Vision Made Simple

Reza Zadeh & Everyone at Matroid

Twitter: @Reza_Zadeh, @Matroid

#scaledmlconf

Computer Vision Made Simple



Millions of detectors and streams as easy as this

Outline

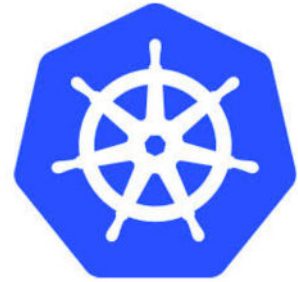
Overview of Infrastructure

Matroid Live Demo

New Announcements

Overview of Infrastructure

Kubernetes

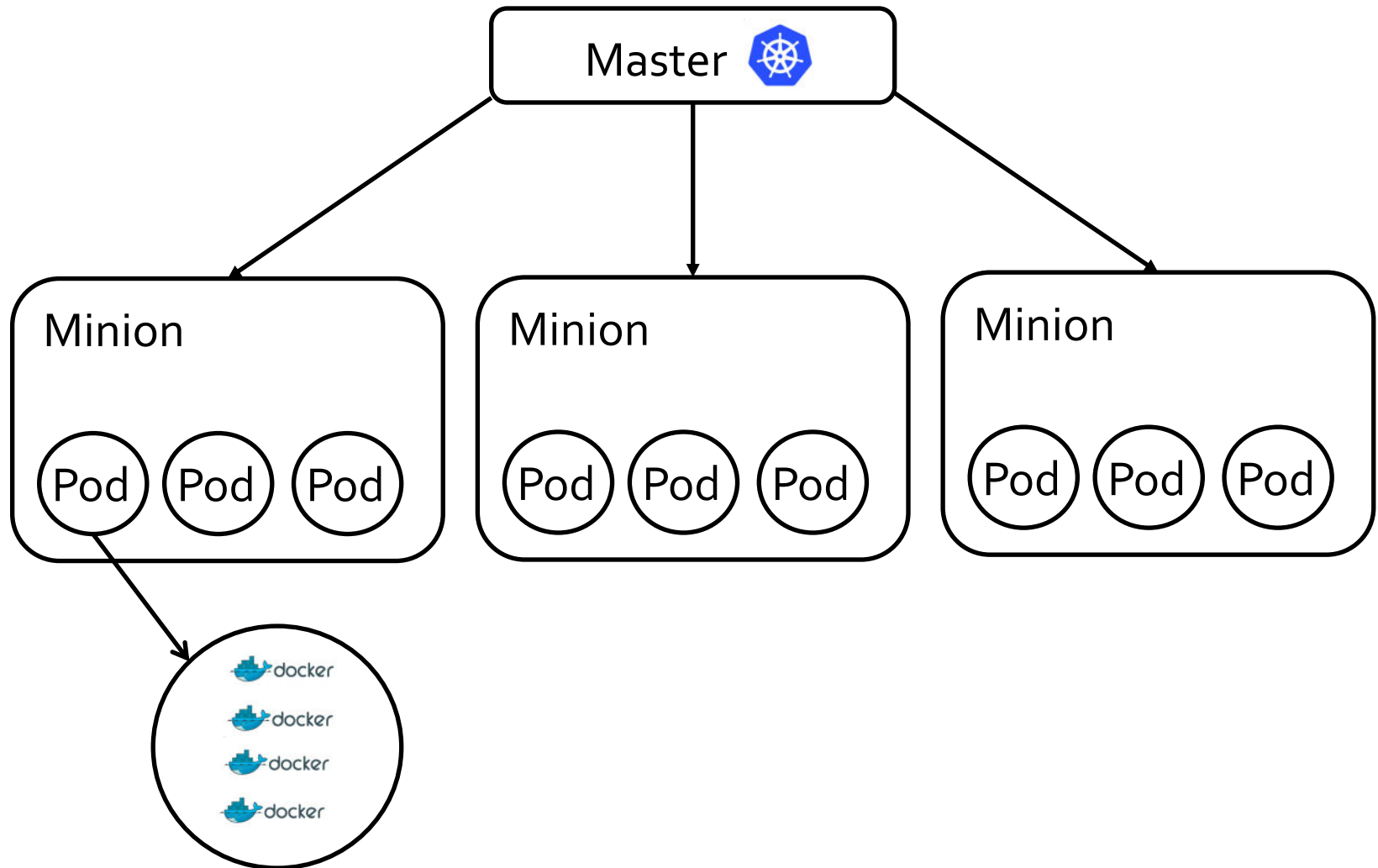


Basic unit: Pod

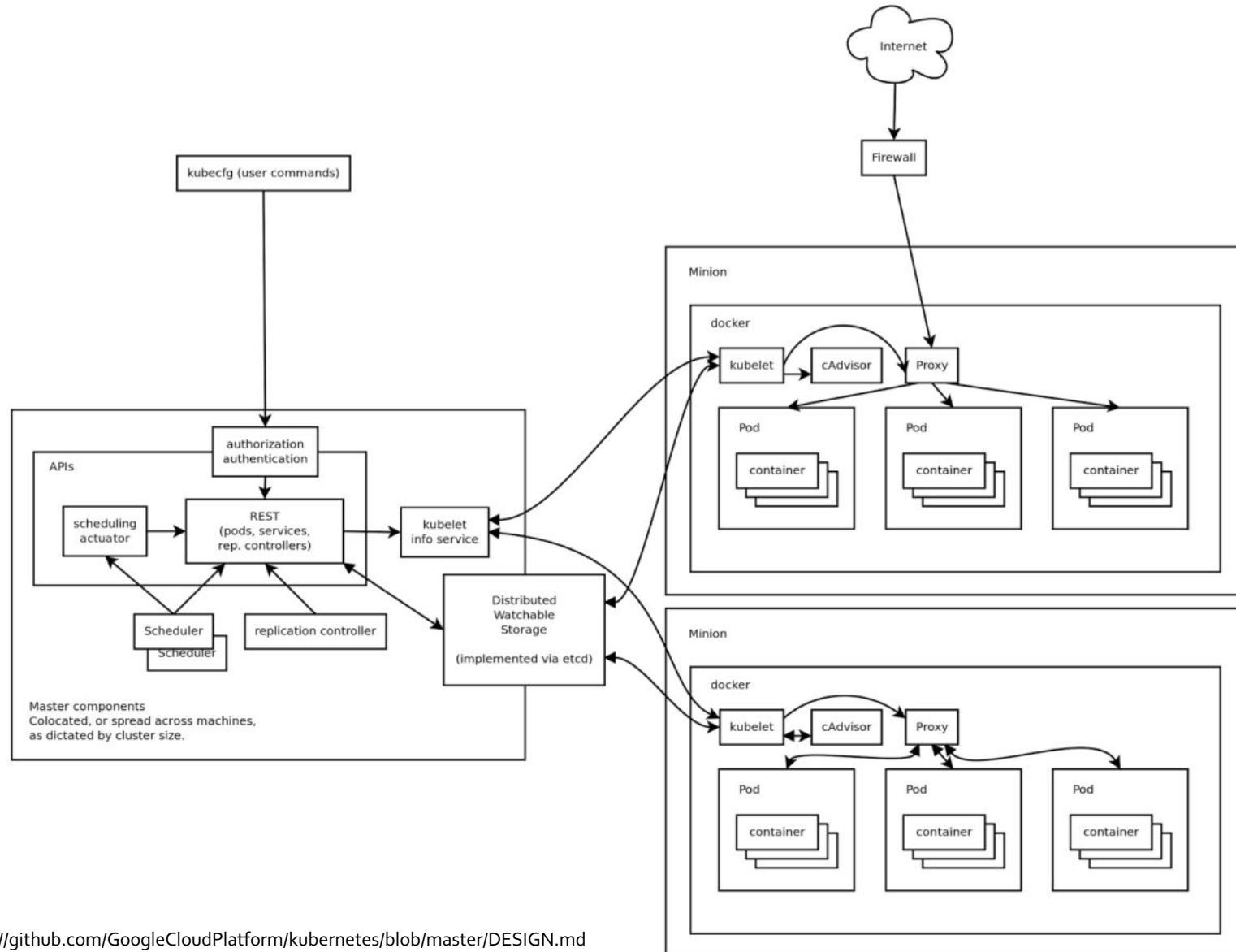
Pods contain one or more containers

Pods are scalable & fault tolerant by K8s

Kubernetes Simplified



Kubernetes Architecture



Matroid Kubernetes Pods

One pod for each of these services



Apache
Zookeeper



mongoDB®



NGINX



aws



TensorFlow

Video Ingest



Each video stream is a kafka topic

Web Server

The NGINX logo is written in a bold, green, sans-serif font.

nginx routes HTTPS and RTMP

Training & Inference

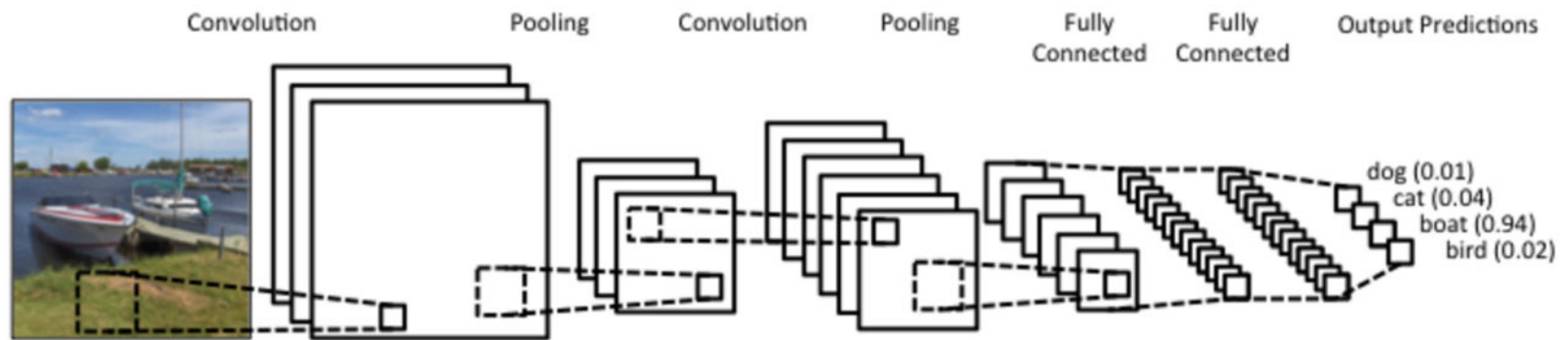


Deep Learning framework from Google Brain

Happy coincidence: A Matroid is a
generalization of a Tensor

Matroid incorporated Oct 2015
TensorFlow released Nov 2015

Convolutional Network



Slide a two-dimensional patch over pixels.

Specialized Chips we'll see presented today.

GPU Machines

Can ask Kubernetes to schedule a pod on a machine with dedicated GPU as of v1.5

Multi-GPU machine support added in v1.6

Auto-scaled based on load

Spot Prices



One pod is always watching out for workers that are going to be evicted because of Spot Instance marketplace

Brings them up as reserved instance if they are needed to handle load

Matroid

Product is a studio for creating and using
“detectors”

Detectors are first class citizens in Matroid

Live Demo

Use Detectors

Create Detectors

Combine Detectors

Elements

A studio for creating and using detectors.

An ever-growing detector library.

Video player with Computer Vision core.

Tight feedback loop for detector iteration.

An extensive API and stream monitoring.

Work-sharing amongst users, with privacy.

Combining Detectors

Combine & chain detectors

Sliding detectors

Import TF Models

Improve on existing detectors

Auto-label with existing detectors

Free TensorFlow Model Hosting

Stream Monitoring

Ingestion support RTMP, RTSP, Snapshots,
and many others

Same ingestion mechanism as Ustream,
Twitch, Youtube Live, typical VMS, etc

Opened to all today – matroid.com/streams

Two new products

Camera Partner



Computer Vision solution for Intel Chips

Compress detector to fit on jointly-developed
camera

Camera runs detectors onboard without
internet

Matroid On-Prem



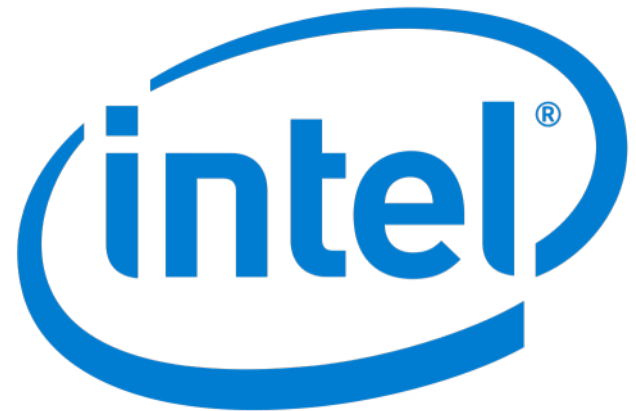
Workstation disconnected from the internet,
runs Matroid webserver internally

Can monitor streams & make detectors,
same as matroid.com

Great for cost-sensitive and privacy-
conscious users

Matroid

\$13.5 million in funding from world-class partners



Open Source Contributions

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TensorFlow for Deep Learning

→ Learn how to solve challenging machine learning problems with TensorFlow, Google's revolutionary new software library for deep learning. If you have some background in basic linear algebra and calculus, this practical book introduces machine-learning fundamentals by showing you how to design systems capable of detecting objects in images, understanding text, analyzing video, and predicting the properties of potential medicines.

TensorFlow for Deep Learning teaches concepts through practical examples and helps you build knowledge of deep learning foundations from the ground up. It's ideal for practicing developers with experience designing software systems, and useful for scientists and other professionals familiar with scripting but not necessarily with designing learning algorithms.

- Learn TensorFlow fundamentals, including how to perform basic computation
- Build simple learning systems to understand their mathematical foundations
- Dive into fully connected deep networks used in thousands of applications
- Turn prototypes into high-quality models with hyperparameter optimization
- Process images with convolutional neural networks
- Handle natural language datasets with recurrent neural networks
- Use reinforcement learning to solve games such as tic-tac-toe
- Train deep networks with hardware including GPUs and tensor processing units

"This is a fantastic book for machine learning practitioners wanting to get started in the exciting field of deep learning. The breadth of the topics covered makes this book a reference you will come back to in order to drive your skills to the next level."

—Marvin Bertin
Machine Learning Research Engineer at
Freemove

Bharath Ramsundar is the lead developer and creator of DeepChem.io, an open source package built with TensorFlow that aims to democratize the use of deep learning in drug discovery. He's a PhD student in computer science at Stanford University.

Reza Bosagh Zadeh is Founder and CEO of Matroid and Adjunct Professor at Stanford University, where he teaches graduate classes on machine learning and algorithms. He built the machine learning algorithms behind Twitter's who-to-follow system.

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facebook.com/oreilly

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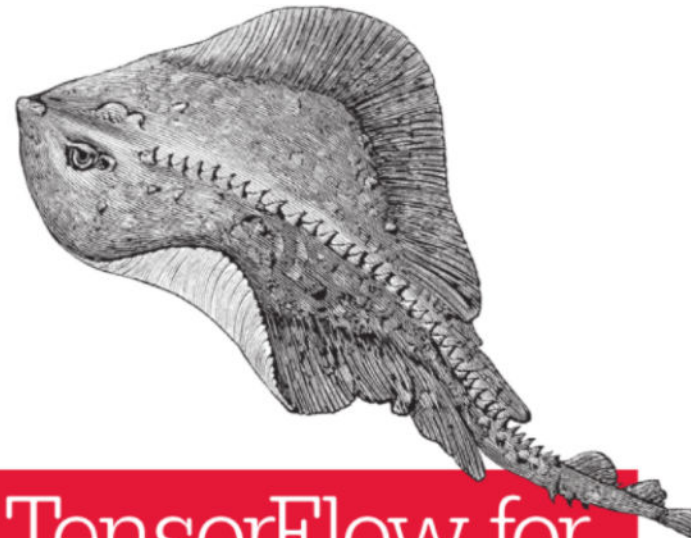


TensorFlow for Deep Learning

Ramsundar & Zadeh

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TensorFlow for Deep Learning

FROM LINEAR REGRESSION TO REINFORCEMENT LEARNING

Bharath Ramsundar &
Reza Bosagh Zadeh

Thanks to

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Penny Chronis

Special thanks to



Special thanks to

SCIEN The Stanford Center for
Image System Engineering



INSTITUTE for COMPUTATIONAL &
MATHEMATICAL ENGINEERING
at STANFORD UNIVERSITY

Thank you for your attention



Available right now on matroid.com