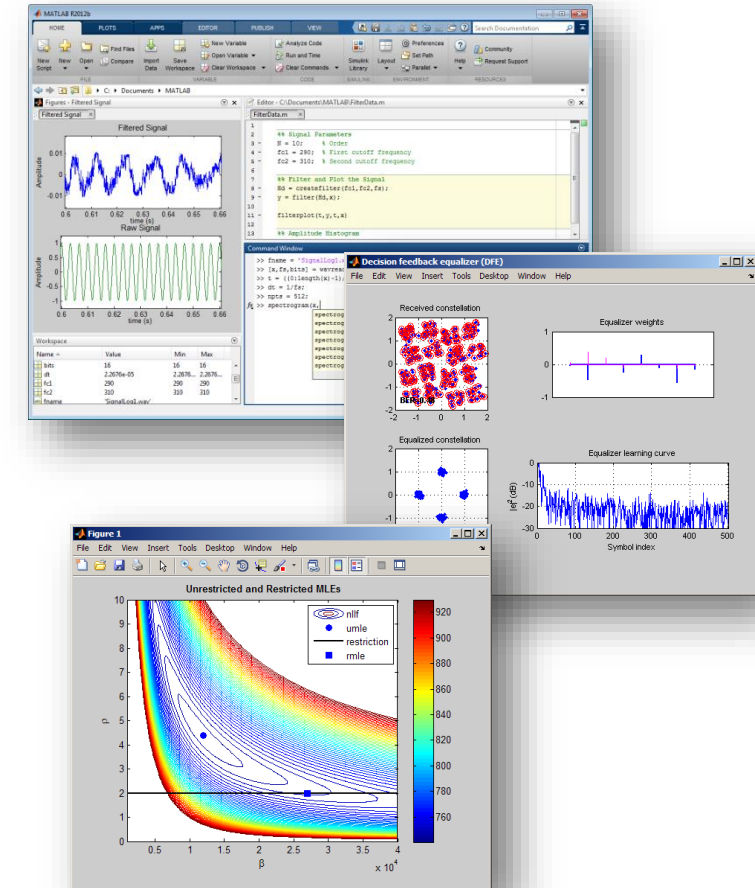


# Introduction to MATLAB

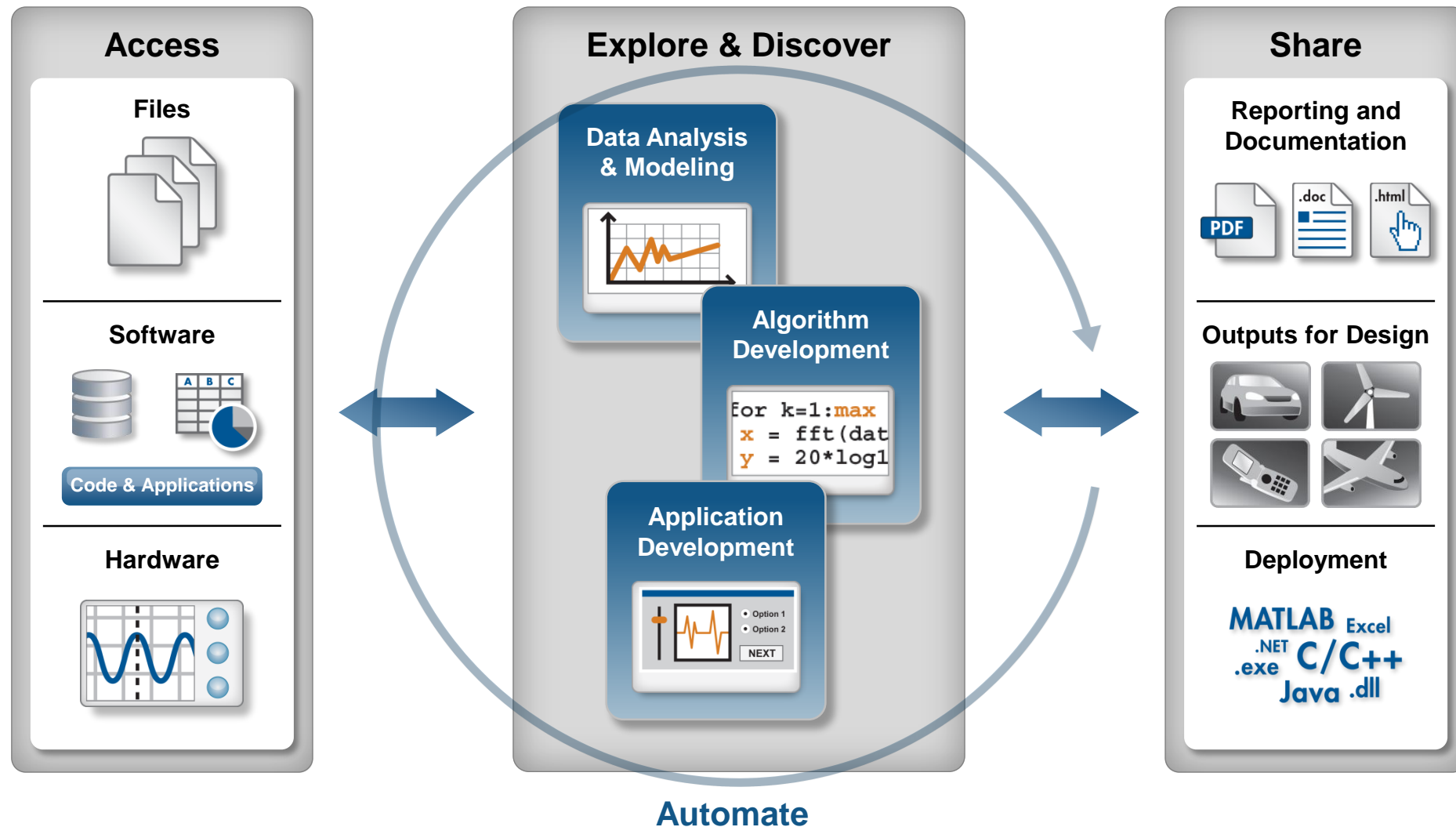
**Andy Thé**  
**MathWorks Product Marketing Manager**

# What is MATLAB?

- High-level language
- Interactive development environment
- Used for:
  - Numerical computation
  - Data analysis and visualization
  - Algorithm development and programming
  - Application development and deployment

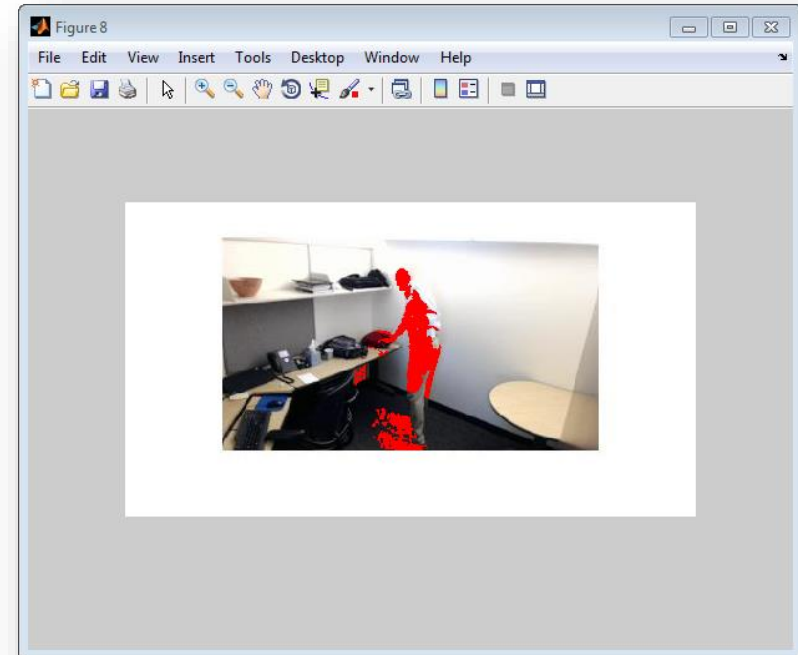


# Technical Computing Workflow



# Demo: Intruder Detection System

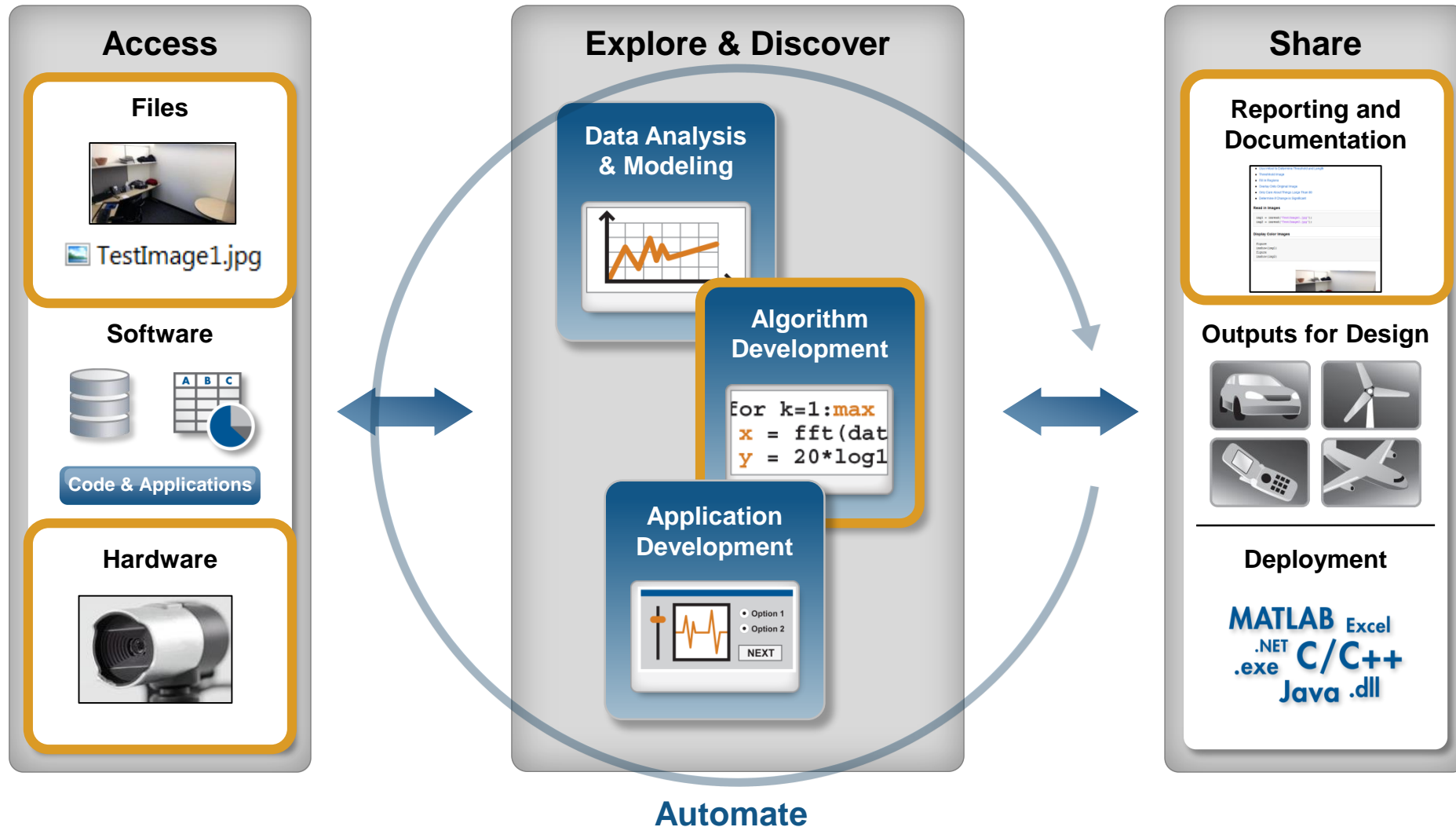
- Goal: Explore images to create and share an intruder detection algorithm
- Approach:
  - Develop using static images
  - Document with a published report
  - Extend to live webcam video



# Demo: Intruder Detection System

**Products Used**

- MATLAB
- Image Processing Toolbox



# Learn More: MATLAB

Products & Services > MATLAB



The Language of Technical Computing

Overview

Videos

Code Examples

Webinars

MATLAB® is a high-level language and interactive environment for numerical computation, visualization, and programming. Using MATLAB, you can analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java™.

You can use MATLAB for a range of applications, including signal processing and communications, image and video processing, control systems, test and measurement, computational finance, and computational biology. More than a million engineers and scientists in industry and academia use MATLAB, the language of technical computing.

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**R2013b**  
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Getting Started with MATLAB  
5:07

MATLAB and Simulink  
Student Version

Documentation **fx** Functions Data Sheet Key Features

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Numeric Computation



Data Analysis and Visualization



Programming and Algorithm



Application Development and

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- Cumulative Matrix Multiplication Nicolas Agotte
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- Metropol Loader Sam Roberson
- High pass filter implementation using HDL coder SUMEET

**MATLAB Answers**

Recent Questions

- Programmatic Gui - importing and plotting data Carla
- Variable size matrix in simulink Metin
- Is it possible to downgrade MATLAB? Ben
- How do I remove unwanted strings from a table imported from excel? Adekunle Obasa
- Embedded Coder for Matlab R2013b in Linux Roberto Marino
- Help with Speaker recognition Frances

**Blogs**

Recent Updates

- File Exchange Pick of the Week Draw a Polar Dendrogram 21 Feb 2014
- Doug's MATLAB Video Tutorials uicontextmenu and ButtonDownFcn in MATLAB 19 Feb 2014
- Guy and Seth on Simulink How Mature is your Model-Based Design Deployment? 19 Feb 2014
- Cleve's Corner: Cleve Moler on Mathematics and Computing The Tektronix 4081 17 Feb 2014
- MATLAB Spoken Here Ask a Question in Answers with Auto-suggest 14 Feb 2014
- Loren on the Art of MATLAB Double Integration in MATLAB – Methods and Handling Discontinuities, Singularities, and

**Cody**

Recent Problems

- Wayfinding 1 - crossing J-G van der Toorn
- Given an input string, generate a variable name out of it Swapnali Gujar
- Power supply: 230V to 115V J-G van der Toorn
- Return the names and values of the input arguments of a function Swapnali Gujar

**Trendy**

Popular Plots

- British Tabloid Hysteria Correlation Hugo Carr
- National Debt: US v. Canada v. UK

[www.mathworks.com/matlabcentral](http://www.mathworks.com/matlabcentral)



# Learn More: Image Processing Toolbox

The screenshot shows the MathWorks website for the Image Processing Toolbox. The navigation bar at the top includes links for Products & Services, Solutions, Academia, Support, User Community, Events, and Company. Below the navigation bar, the breadcrumb trail reads "Products & Services > Image Processing Toolbox". The main header features a large, colorful satellite image of a city with the title "Image Processing Toolbox" and the subtitle "Perform image processing, analysis, and algorithm development". A "Share" button is visible in the bottom right corner of the header image.

On the left side, there is a sidebar with the following links: Overview, Videos & Examples (highlighted with an orange border), Webinars, and Related Products.

The main content area contains the following text:

Image Processing Toolbox™ provides a comprehensive set of reference-standard algorithms, functions, and [apps for image processing](#), analysis, visualization, and algorithm development. You can perform [image enhancement](#), image deblurring, feature detection, noise reduction, [image segmentation](#), geometric transformations, and image registration. Many toolbox functions are multithreaded to take advantage of multicore and multiprocessor computers.

Image Processing Toolbox supports a diverse set of image types, including high dynamic range, gigapixel resolution, embedded ICC profile, and tomographic. [Visualization functions](#) let you explore an image, examine a region of pixels, adjust the contrast, create contours or histograms, and manipulate regions of interest (ROIs). With [toolbox algorithms](#) you can restore degraded images, detect and measure features, [analyze shapes](#) and textures, and adjust color balance.

Below the text, there is a list of key features:

- ▶ Key Features
- ▶ Importing and Exporting Images
- ▶ Displaying and Exploring Images
- ▶ Preprocessing and Postprocessing Images
- ▶ Analyzing Images

To the right of the list is a video player showing a product overview. Below the video player, the text "Product Overview: 1:52" is visible.

On the right side of the page, there is a "TRY OR BUY" section with links for [Contact Sales](#), [Product Trial](#), and [Pricing and Licensing](#). Below this is a "What's New" section featuring a photo of Andy Thé, Image Processing Toolbox Technical Expert, and a link to [Camera-in-a-Capsule Diagnoses Gastrointestinal Disorders](#), with an "Email Andy" link below it. At the bottom right, there is a "Technical Resources" section with links for [Support](#) and [New Features](#).

[www.mathworks.com/products/image](http://www.mathworks.com/products/image)