Incorporating the Camera and Photo Library in Your App

Emilie Kim
Photos Engineer

Thank You, Developers!

for more than

3,500

photography applications in the App Store!

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

Customize the Camera Experience

Customize the Camera Experience

- Extended UIImagePickerController API
- Programmatically control camera
- Build your own camera controls

Customize the Camera Experience

- Flash mode

Flash Mode

```
@property UIImagePickerControllerCameraFlashMode cameraFlashMode;
```

```
UIImagePickerControllerCameraFlashModeOn
UIImagePickerControllerCameraFlashModeOff
UIImagePickerControllerCameraFlashModeAuto
```

Customize the Camera Experience

- Flash mode

Customize the Camera Experience

- Flash mode
- Camera device

Camera Device

```
@property UIImagePickerControllerCameraDevice cameraDevice;
```

```
UIImagePickerControllerCameraDeviceRear
UIImagePickerControllerCameraDeviceFront
```

Customize the Camera Experience

- Flash mode
- Camera device

Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode

Capture Mode

```
@property UIImagePickerControllerCameraCaptureMode cameraCaptureMode;
```

```
UIImagePickerControllerCameraCaptureModePhoto
UIImagePickerControllerCameraCaptureModeVideo
```

Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode

Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode
- Video quality

Video Quality

```
UIImagePickerControllerQualityTypeLow,
UIImagePickerControllerQualityTypeMedium,
UIImagePickerControllerQualityTypeHigh
```

Video Quality

```
UIImagePickerControllerQualityTypeLow,
UIImagePickerControllerQualityTypeMedium,
UIImagePickerControllerQualityType640x480,
UIImagePickerControllerQualityTypeHigh
```

- Relative qualities are device-dependent

UIImagePickerControllerQualityTypeHigh

iPhone 3GS	iPhone 4
640 x 480 VGA	720p HD

Video Quality

```
UIImagePickerControllerQualityTypeLow,
UIImagePickerControllerQualityTypeMedium,
UIImagePickerControllerQualityType640x480,
UIImagePickerControllerQualityTypeHigh
```

- Relative qualities are device-dependent *and camera-dependent*

UIImagePickerControllerQualityTypeHigh

iPhone 3GS	iPhone 4 (rear)	iPhone 4 (front)
640 x 480 VGA	720p HD	640 x 480 VGA

- Use appropriate quality type

Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode
- Video quality

Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode
- Video quality
- Programmatic capture

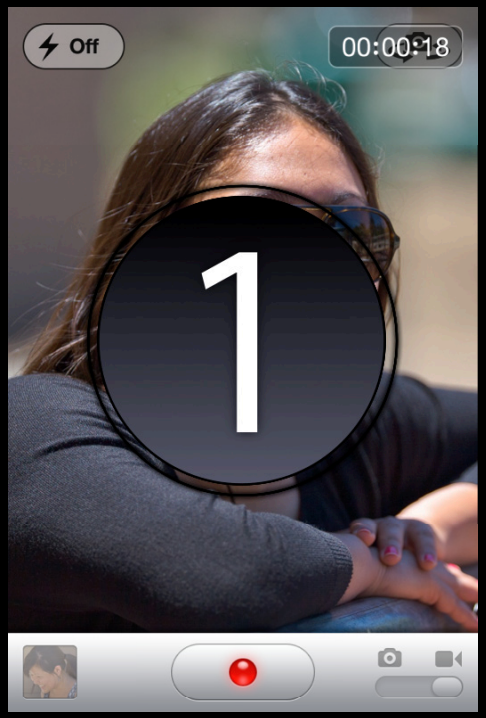
Programmatic Capture

```
- (void)takePicture;
```

Programmatic Capture

```
- (void)takePicture;

- (BOOL)startVideoCapture;
- (void)stopVideoCapture;
```



Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode
- Video quality
- Programmatic capture

Customize the Camera Experience

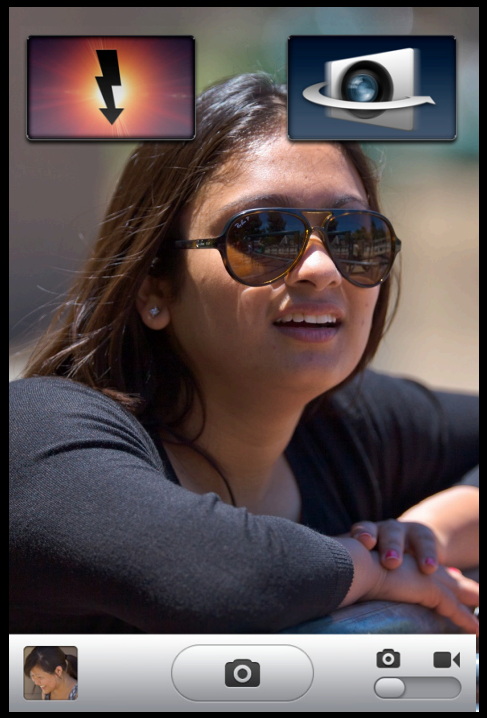
- Flash mode
- Camera device
- Capture mode
- Video quality
- Programmatic capture
- Custom overlay view

Custom Overlay View

3.1

```
@property UIView *cameraOverlayView;
```

- Build your own camera controls
- Create immersive camera experience



Customize the Camera Experience

- Flash mode
- Camera device
- Capture mode
- Video quality
- Programmatic capture
- Custom overlay view

What You'll See

- Programmatically control video capture
- Create custom overlay view
- Expose video quality settings

Demo 1

Customize the camera experience

Hernán Eguiluz
Photos Engineer

Best Practices

- Fully customizable image and video capture experience
- Easy-to-use camera APIs let you focus on your application
- For even more control, check out AVFoundation

Using the Camera with AV Foundation	Presidio Tuesday 4:30PM

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

Image Picker and You

- UIImagePickerController
- Great for basic photo picking
- Your feature requests
  - More control over behavior
  - More control over look and feel
  - Access to full size images
  - Access to image metadata

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

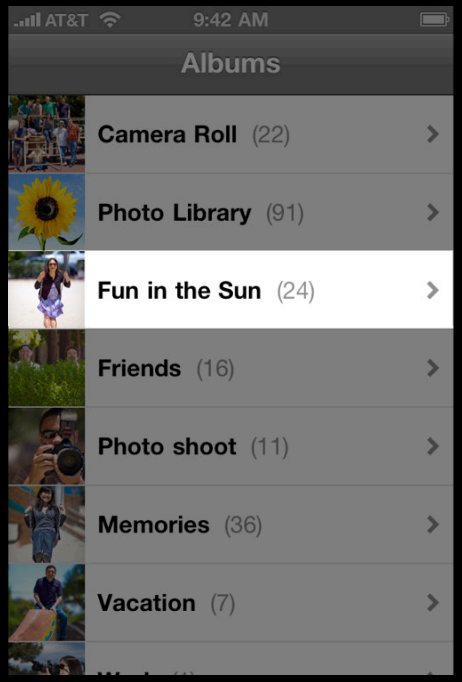
Assets Library Framework

Assets Library Framework

- New in iOS 4
- Access to photo library images and videos
- Original photo and video data
- Metadata

Assets Library Framework

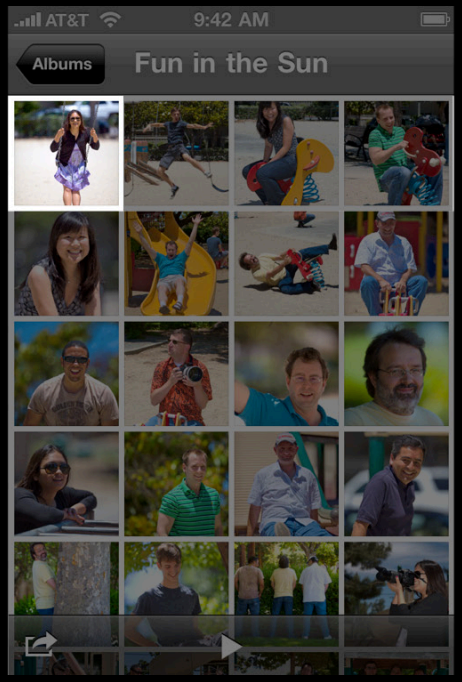
Concept



Library

Assets Library Framework

Concept



Album

Assets Library Framework

Concept

Photo

Assets Library Framework

- ALAssetsLibrary
- ALAssetsGroup
- ALAssetsFilter
- ALAsset
- ALAssetRepresentation

ALAssetsLibrary

- Root photo library object

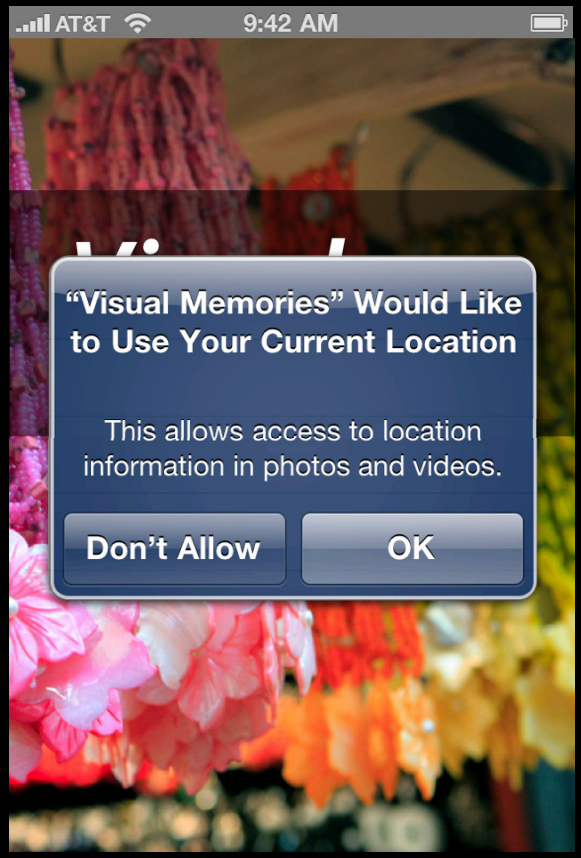
ALAssetsLibrary

- Root photo library object
- User grants permission

ALAssetsLibrary

User grants permission

- Potentially sensitive photo data
- Dialog on application's behalf
- Does not affect UIImagePickerController
- Access can be changed in Settings



ALAssetsLibrary

- Root photo library object
- User grants permission

ALAssetsLibrary

- Root photo library object
- User grants permission
- Read-only access to photo library images and videos

ALAssetsLibrary

- Root photo library object
- User grants permission
- Read-only access to photo library images and videos
- Enumerate photo albums

ALAssetsGroup

- Photo album object

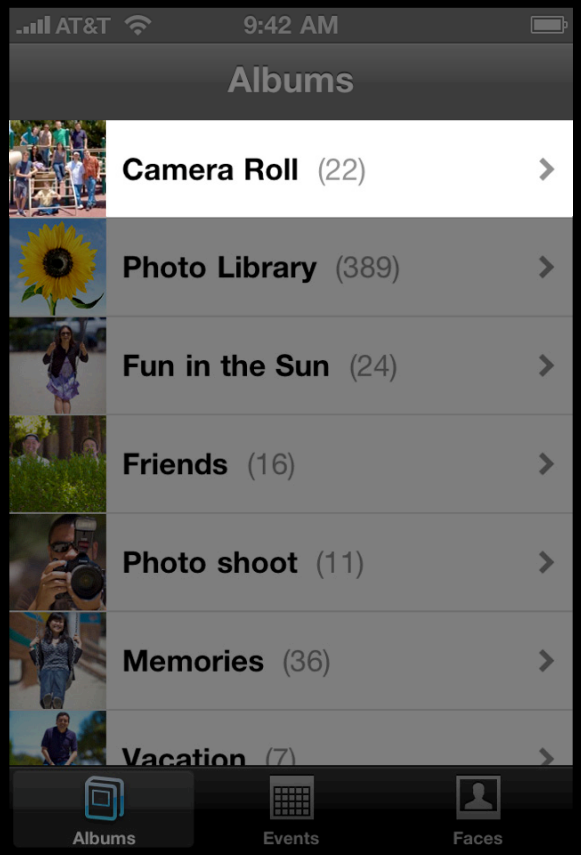
ALAssetsGroup

- Photo album object
- Five group types

ALAssetsGroup

Group types

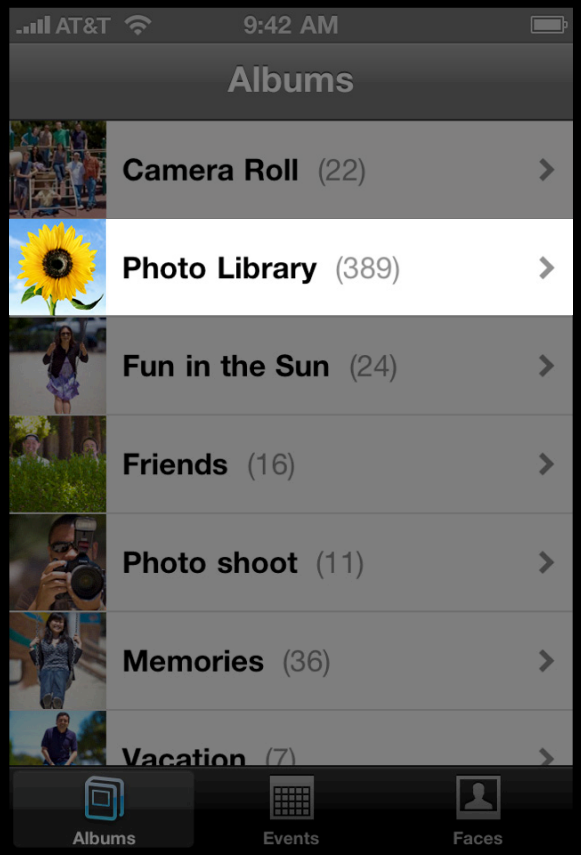
- Saved photos album



ALAssetsGroup

Group types

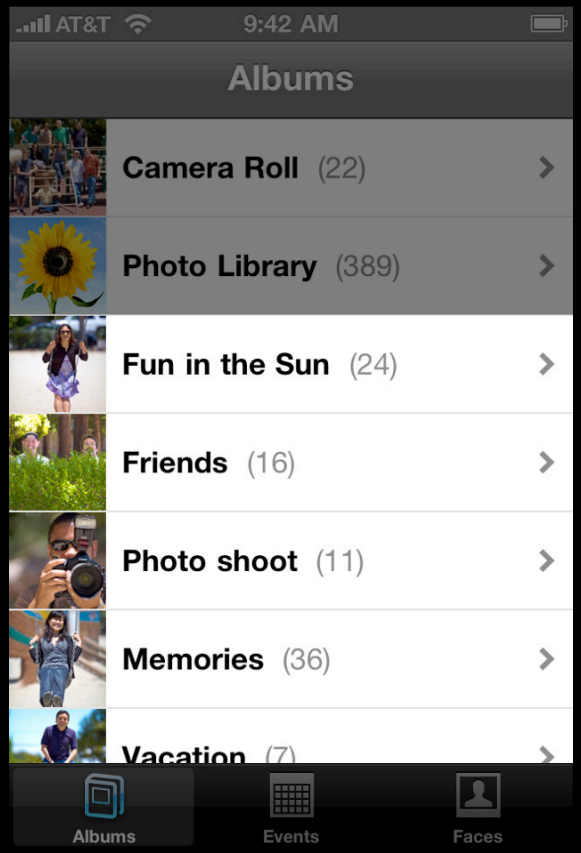
- Saved photos album
- Photo library



ALAssetsGroup

Group types

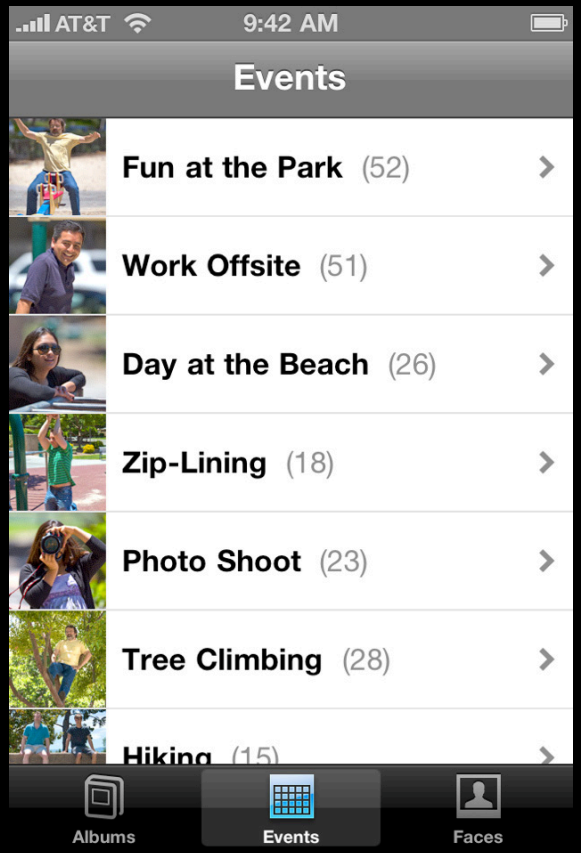
- Saved photos album
- Photo library
- Albums



ALAssetsGroup

Group types

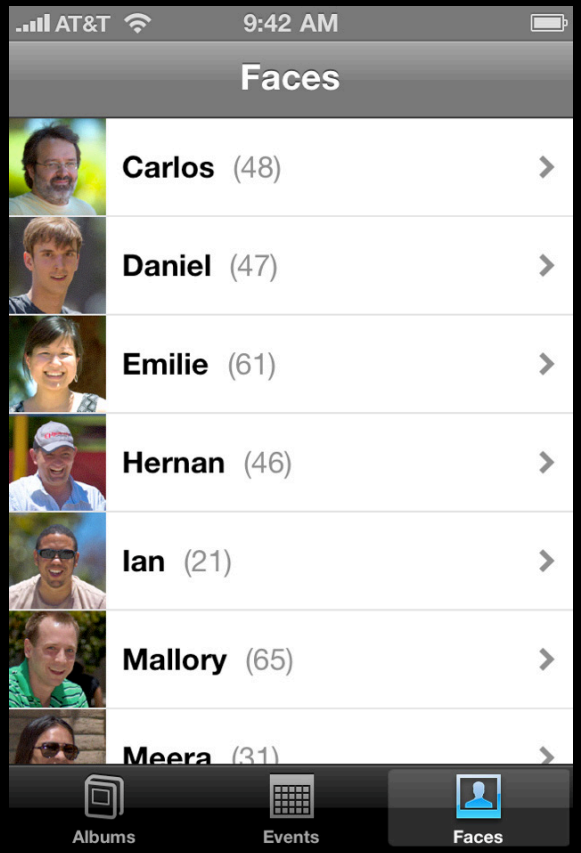
- Saved photos album
- Photo library
- Albums
- Events



ALAssetsGroup

Group types

- Saved photos album
- Photo library
- Albums
- Events
- Faces



ALAssetsGroup

- Photo album object
- Five group types
- Filter assets with ALAssetsFilter

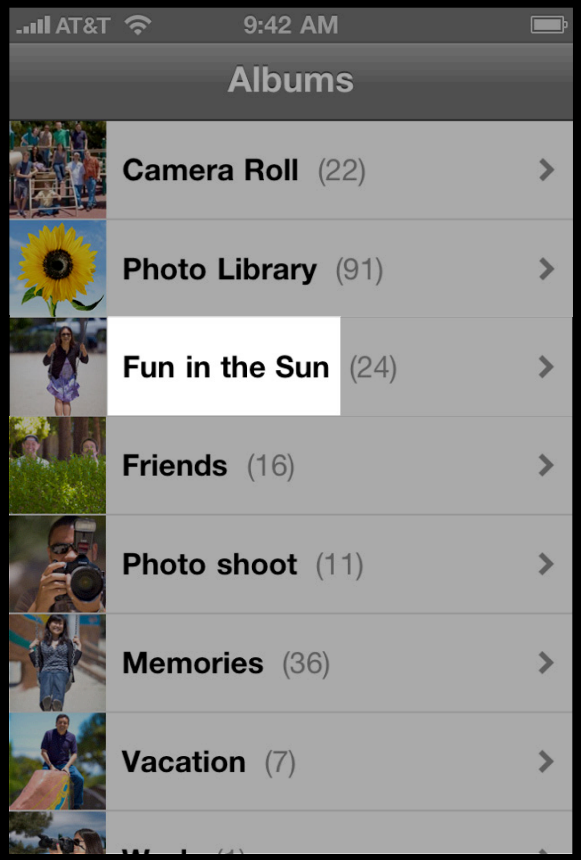
ALAssetsGroup

- Photo album object
- Five group types
- Filter assets with ALAssetsFilter
- Group properties

ALAssetsGroup

Group properties

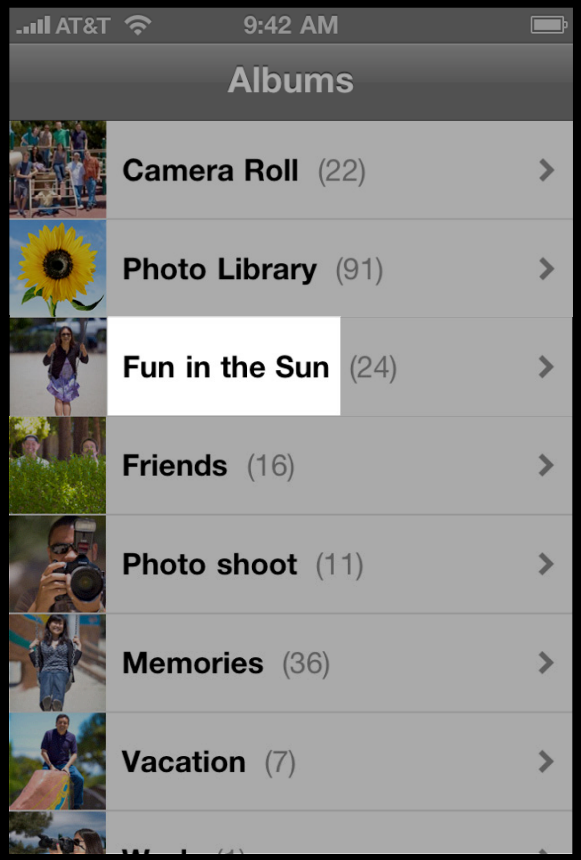
- Name



ALAssetsGroup

Group properties

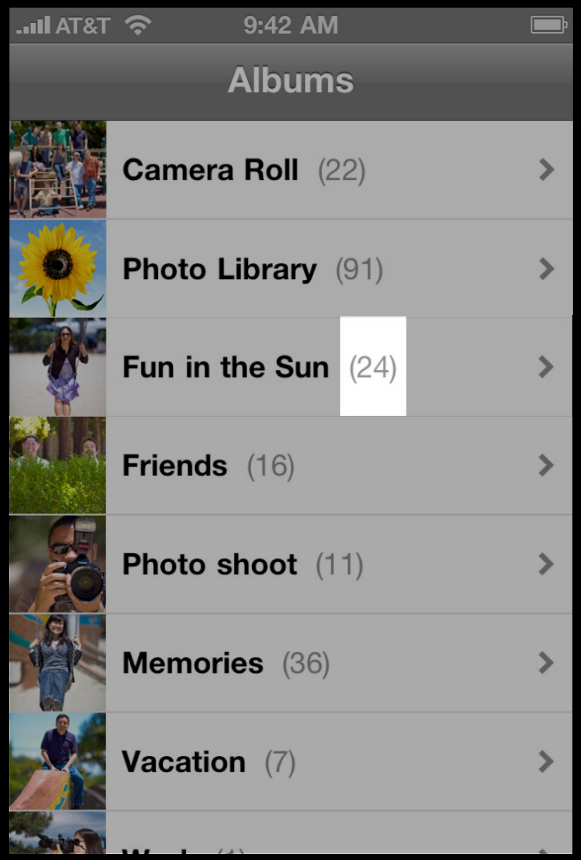
- Name
- Count



ALAssetsGroup

Group properties

- Name
- Count
- Album thumbnail



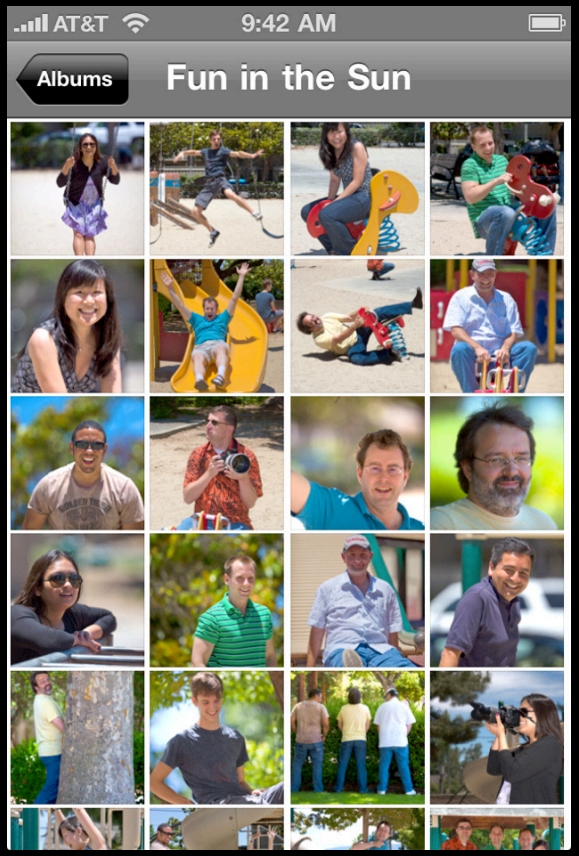
ALAssetsGroup

- Photo album object
- Five group types
- Filter assets with ALAssetsFilter
- Group properties
- Enumerate photos and videos

ALAssetsGroup

Enumerate assets

- Blocks-based enumeration API
- Similar to NSArray
- Enumerate chronologically



ALAssetsGroup

Enumerate assets

- Blocks-based enumeration API
- Similar to NSArray
- Enumerate chronologically
- Display most recent first

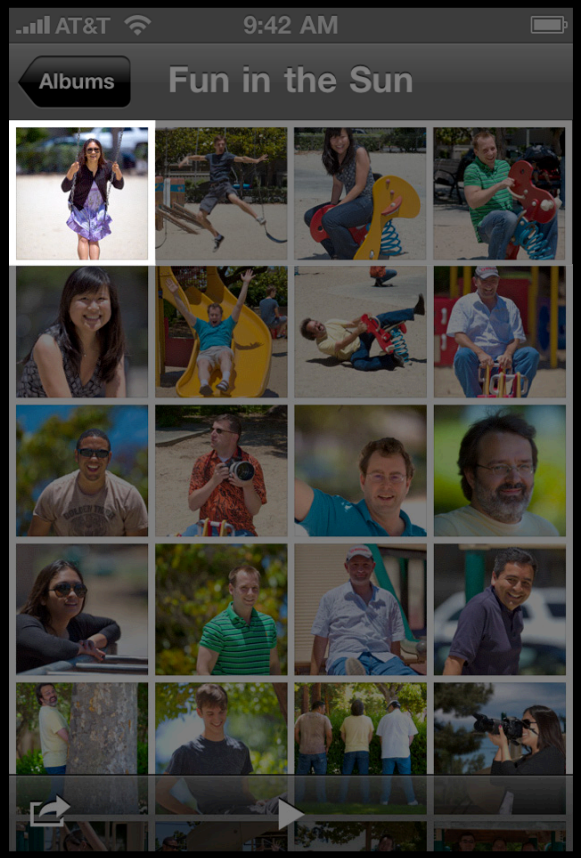
ALAssetsGroup

Enumerate assets

- Blocks-based enumeration API
- Similar to NSArray
- Enumerate chronologically
- Display most recent first
- Optimize scrolling performance

ALAsset

- Contains multiple representations



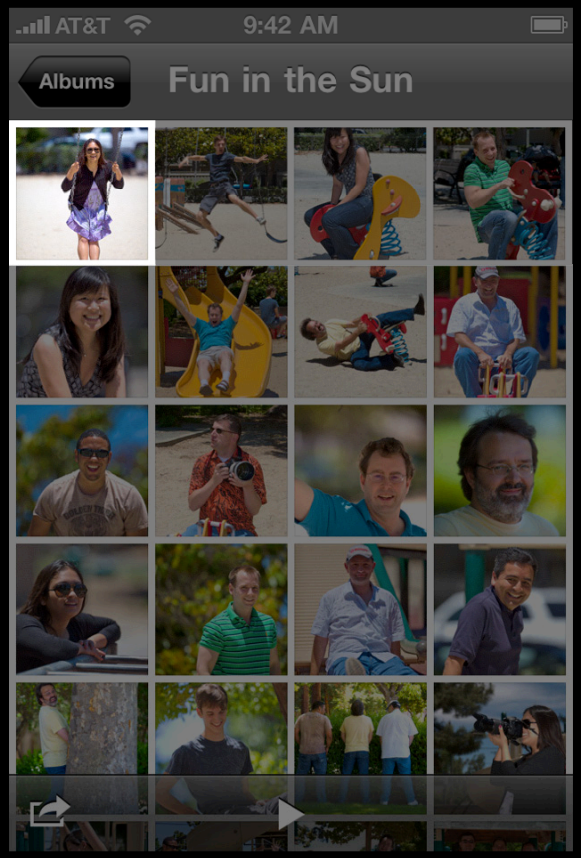
ALAsset

Multiple representations

- Same asset with multiple formats
  - RAW + JPG
  - AVI + THM
- Default representation
- All representations

ALAsset

- Contains multiple representations
- Asset properties
  - Thumbnail
  - Date
  - Location



ALAssetRepresentation

- Photo or video representation object

ALAssetRepresentation

- Photo or video representation object
- Persistent URL

ALAssetRepresentation

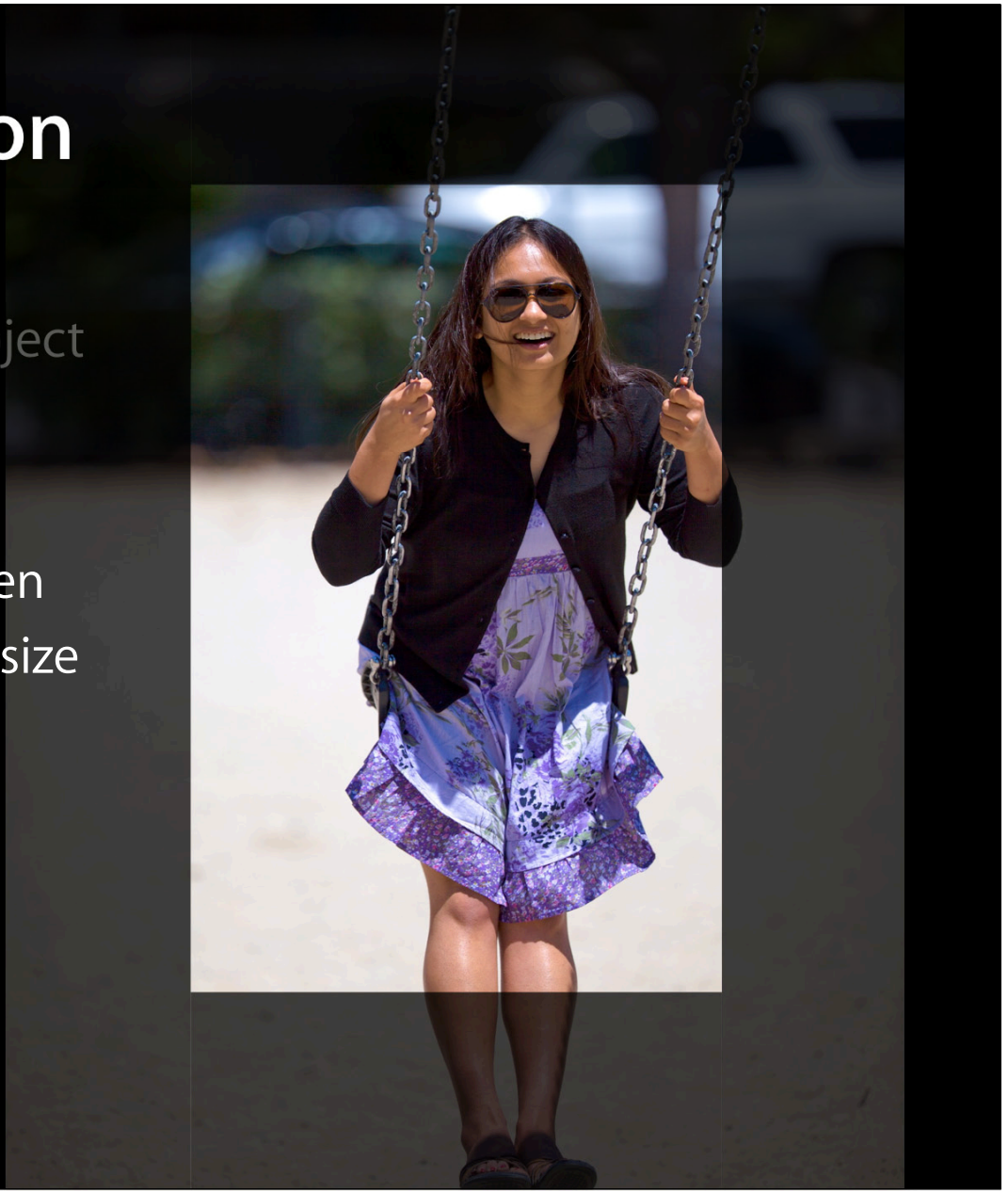
- Photo or video representation object
- Persistent URL
- Full screen image
  - CGImage for displaying full screen

ALAssetRepresentation

- Photo or video representation object
- Persistent URL
- Full screen image
  - CGImage for displaying full screen

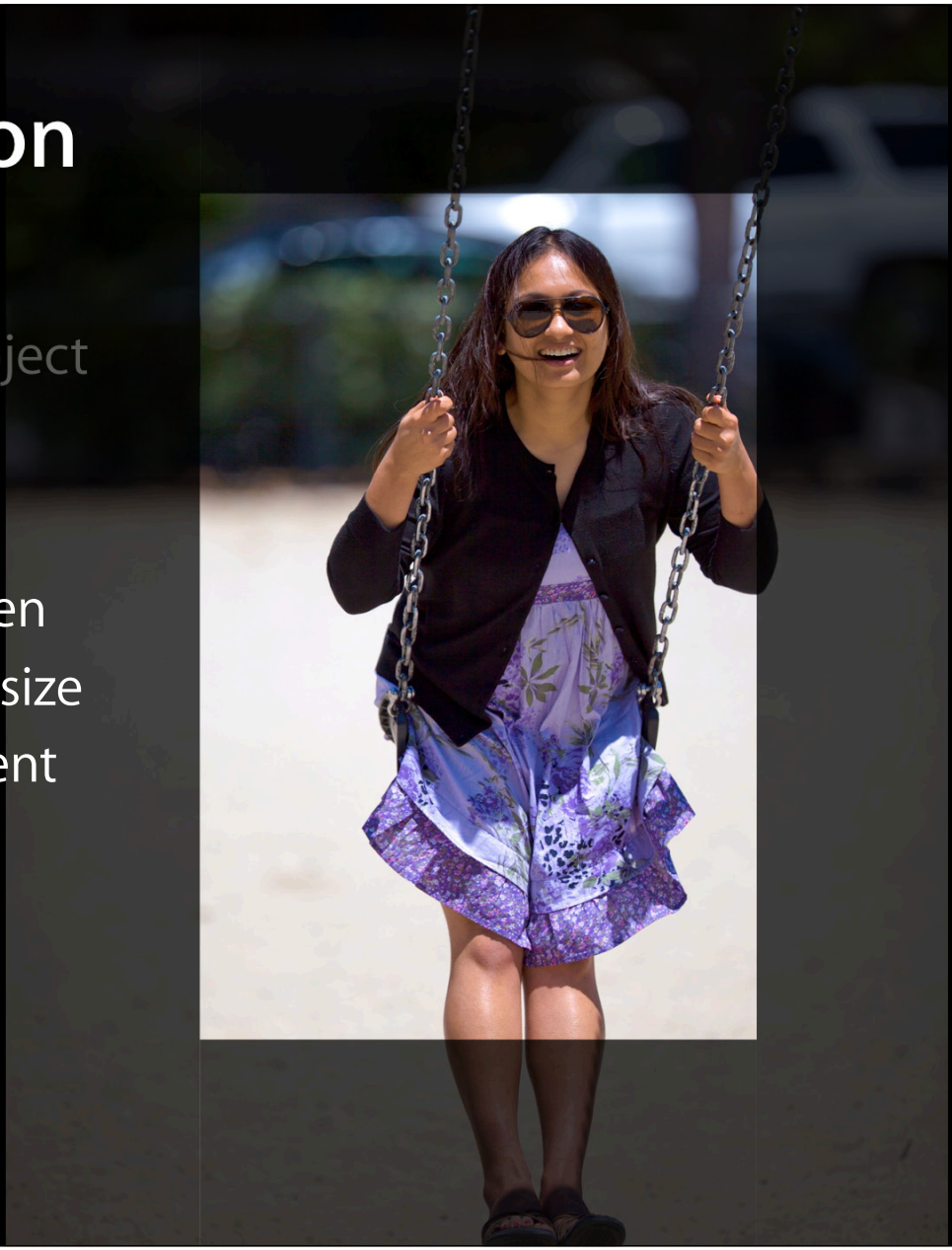
ALAssetRepresentation

- Photo or video representation object
- Persistent URL
- Full screen image
  - CGImage for displaying full screen
  - Image size is not exactly screen size



ALAssetRepresentation

- Photo or video representation object
- Persistent URL
- Full screen image
  - CGImage for displaying full screen
  - Image size is not exactly screen size
  - Image size is hardware-dependent



Assets Library Framework

- ALAssetsLibrary
- ALAssetsGroup
- ALAssetsFilter
- ALAsset
- ALAssetRepresentation

What You'll See

- Create your own image picker
- Enumerate groups and assets
- Filter group contents
- Display full screen images
- Handle error conditions

Demo 2

Build your own image picker

Hernán Eguiluz
Photos Engineer

Best Practices

- Simple and concise API
- Always provide the failure block
- Handle access denial gracefully
- Image data comes from asset representation

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

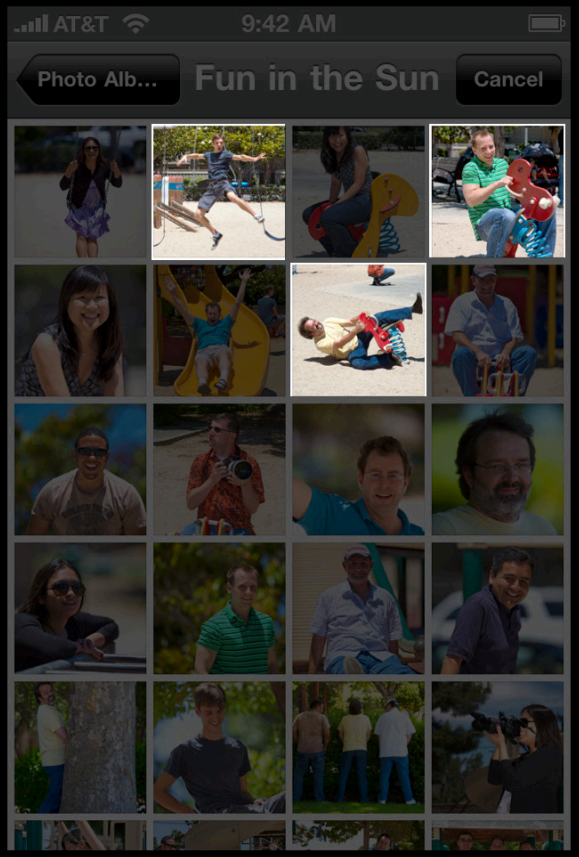
Going Beyond the Image Picker

Going Beyond the Image Picker

- Customize image picker behavior
- Access full size images
- Integrate with other technologies
- Create innovative UI based on metadata

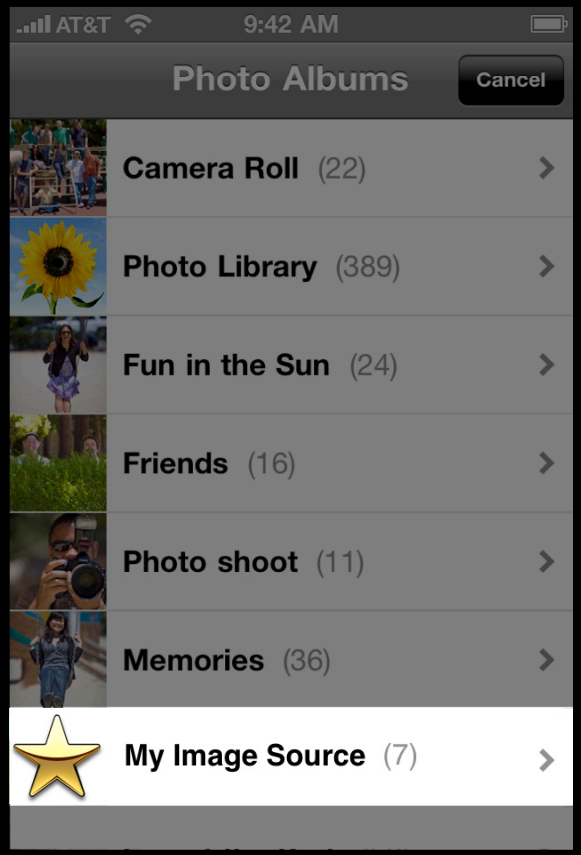
Customizing Image Picker Behavior

- Multiple selection



Customizing Image Picker Behavior

- Multiple selection
- Custom image sources



Customizing Image Picker Behavior

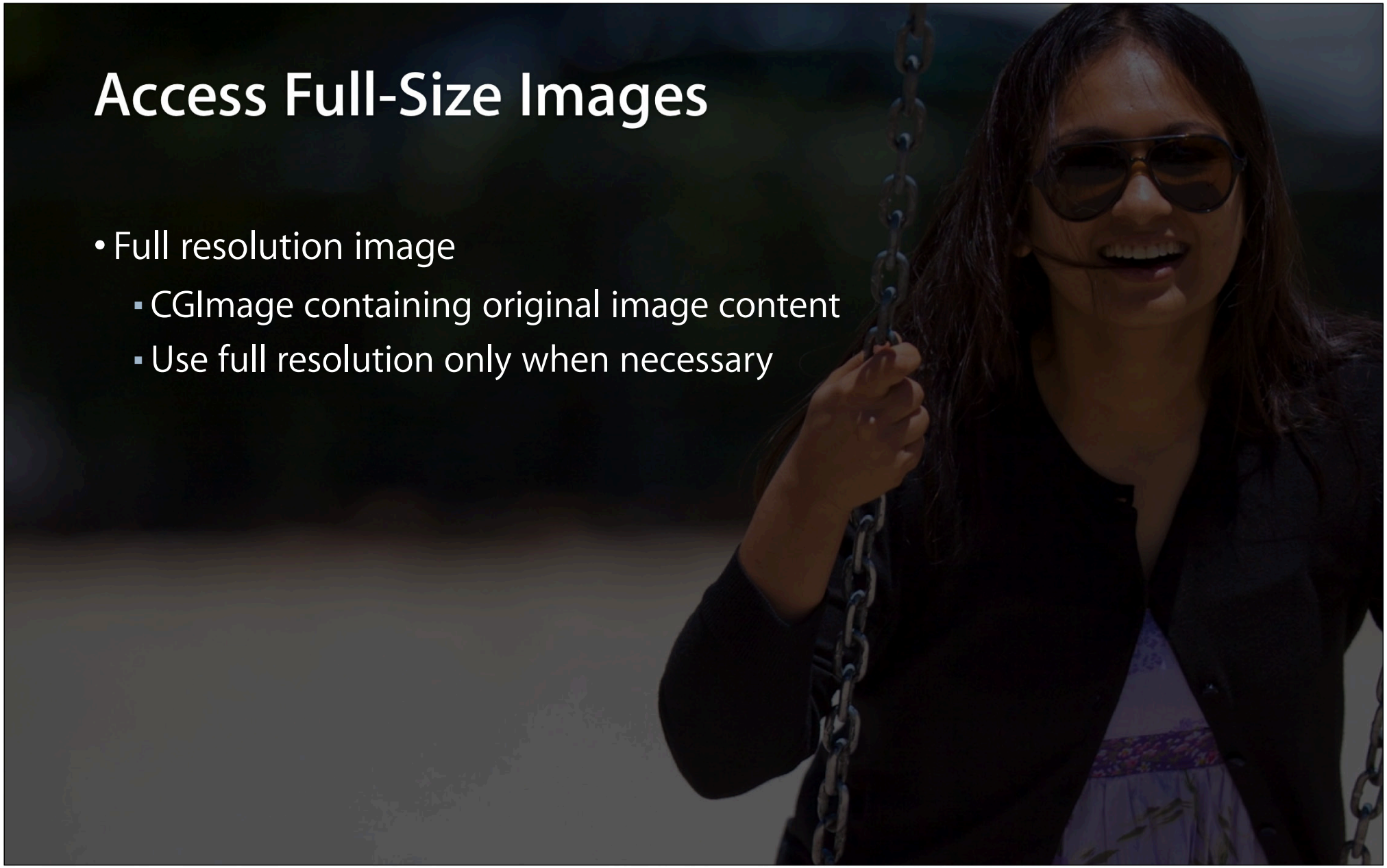
- Multiple selection
- Custom image sources
- Implement your own behavior

Customizing Image Picker Behavior

- Multiple selection
- Custom image sources
- Implement your own behavior

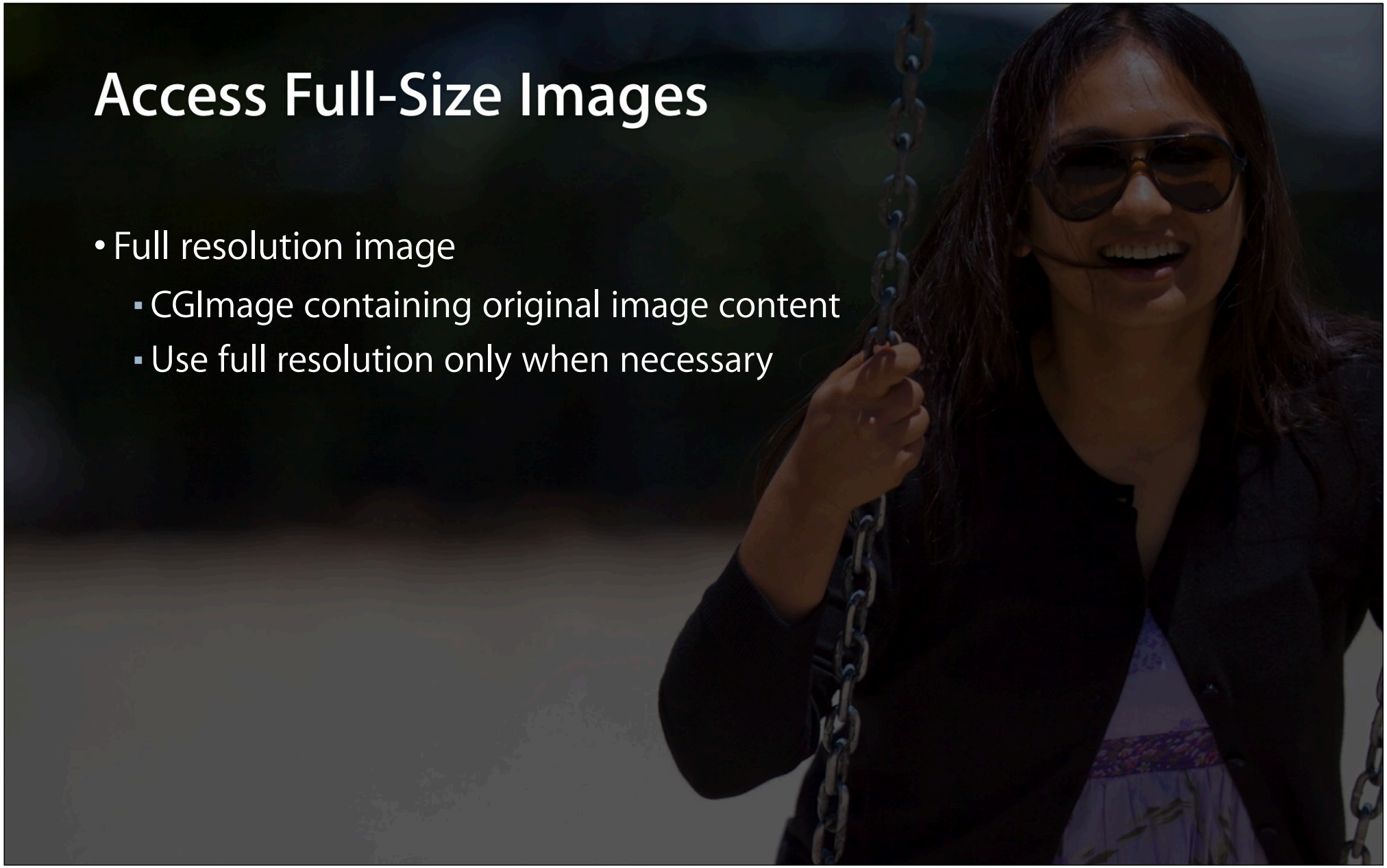
Access Full-Size Images

- Full resolution image
  - CGImage containing original image content
  - Use full resolution only when necessary



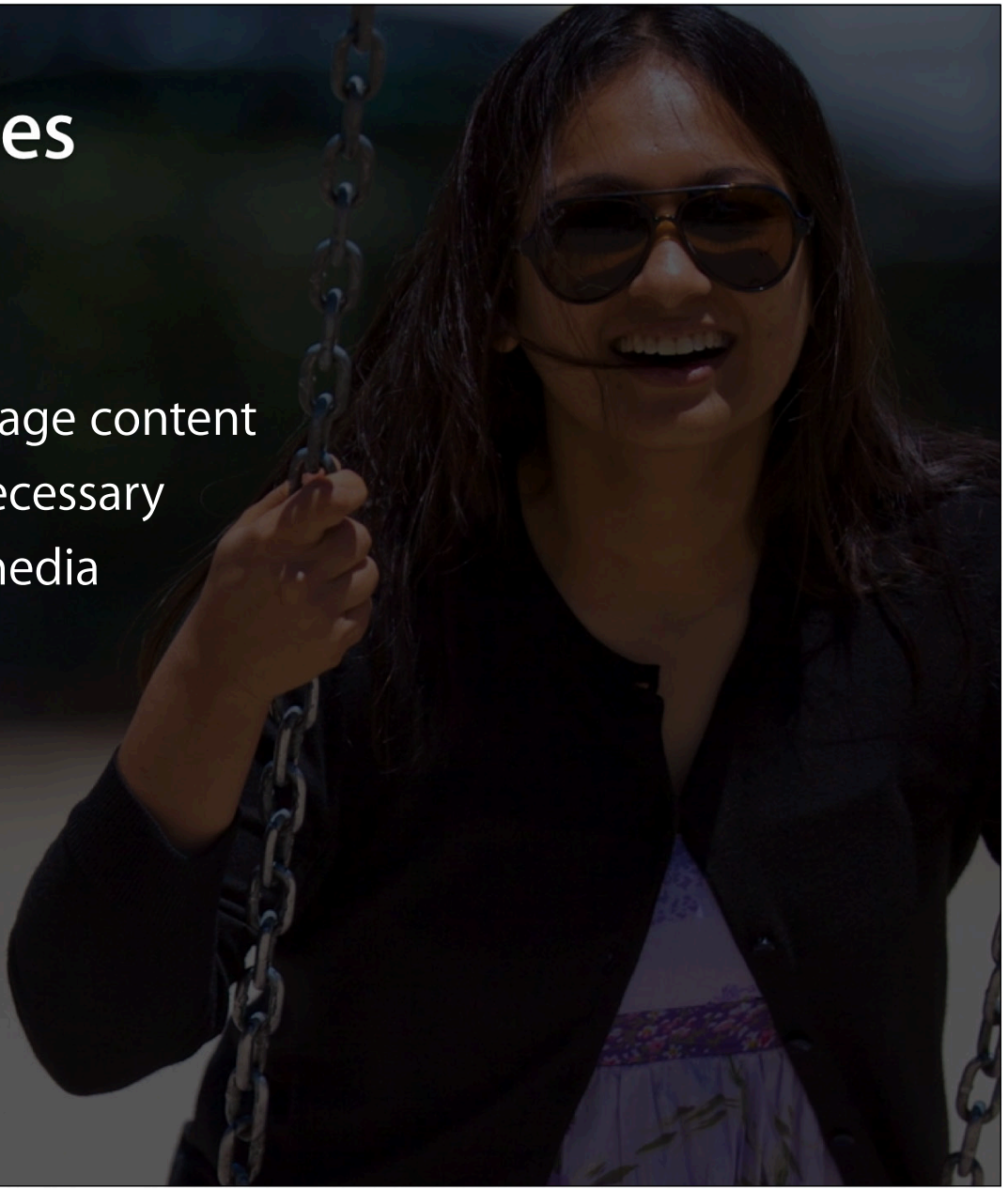
Access Full-Size Images

- Full resolution image
  - CGImage containing original image content
  - Use full resolution only when necessary



Access Full-Size Images

- Full resolution image
  - CGImage containing original image content
  - Use full resolution only when necessary
  - Depends on ability to decode media



Access Full-Size Images

- Full resolution image
  - CGImage containing original image content
  - Use full resolution only when necessary
  - Depends on ability to decode media
- Raw bytes
  - Read large images and videos
  - No file descriptors necessary
  - Pass in buffer and range, get bytes back

Framework Integration

- ImageIO
  - Create custom thumbnails
  - Manipulate image data
  - iPhone OS Developer Documentation

Framework Integration

iOS 4

- ImageIO
  - Create custom thumbnails
  - Manipulate image data
  - iPhone OS Developer Documentation
- AVFoundation
  - Create AVURLAssets
  - Play, compose, edit videos

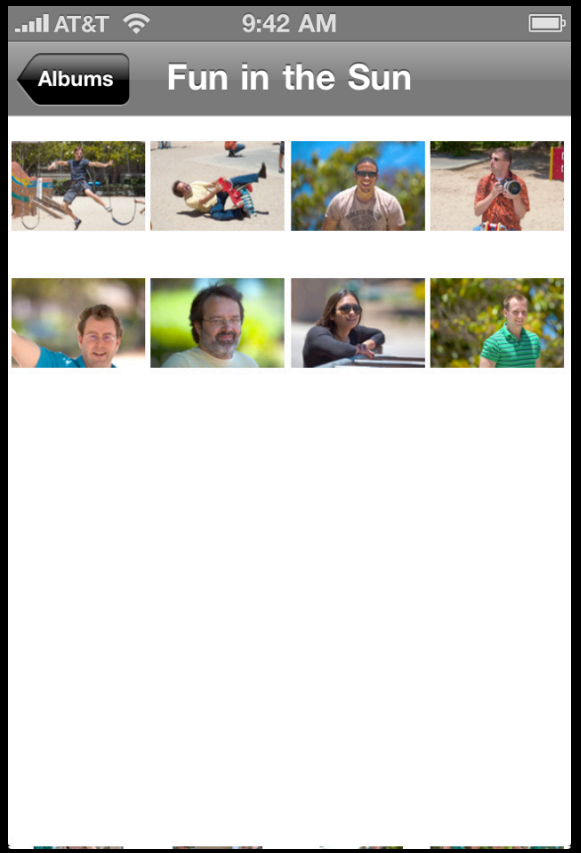
Discovering AV Foundation	Presidio Tuesday 2:00PM	Nob Hill (repeat) Thursday 4:30PM

Exploring Metadata

- Badge images

Exploring Metadata

- Badge images
- Filter based on photo orientation



Exploring Metadata

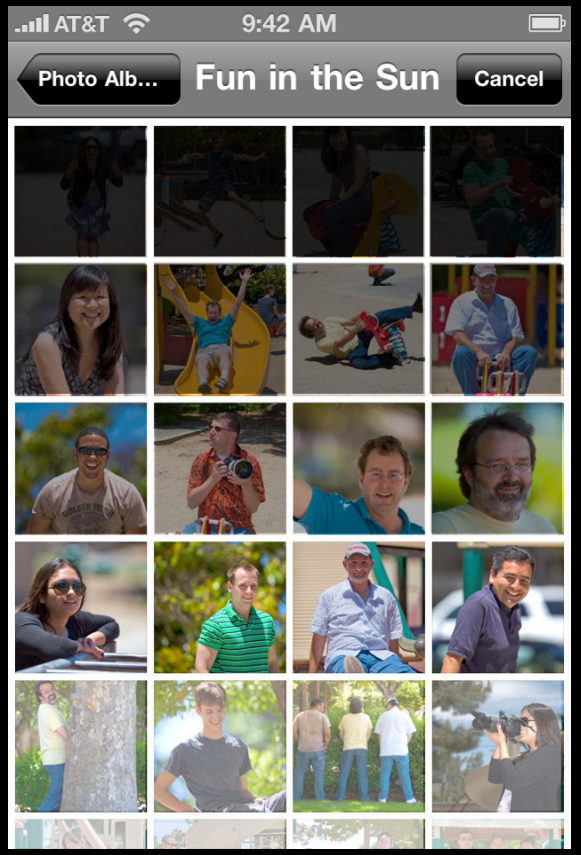
- Badge images
- Filter based on photo orientation
- Create a timeline

Exploring Metadata

- Badge images
- Filter based on photo orientation
- Create a timeline
- Display images geographically

Exploring Metadata

- Badge images
- Filter based on photo orientation
- Create a timeline
- Display images geographically
- Full access to EXIF metadata



What You'll See

- Store and retrieve assets with asset URL
- Create a custom image source
- Read original image data
- Explore asset metadata

Demo 3

Create your own places feature

Hernán Eguiluz
Photos Engineer

Best Practices

- Customize your own image picker behavior
- Use full resolution images when appropriate
- Create novel UI using metadata

Go Crazy with the Metadata

Metering Mode
ISO Speed Ratings
Lens Info
Focal Plane Y Resolution
Date Time
AFInfo
Shutter Speed Value
Pixel Y Dimension
Owner name
Exif Version
Color Space
Gamma
DPI Height
Date Time Digitized
Orientation
Pixel X Dimension
Custom Rendered
Latitude
Date Time Original
Exposure Bias Value
Aperture Value
Profile Name
Continuous Drive
Scene Capture Type
Resolution Unit
Flash
Lens ID
Exposure Time
Lens Model
Exposure Mode
Subsecond Time Original
Longitude
Model
Firmware
Make
Pixel Height
Focal Plane X Resolution
AspectRatioInfo
DPI Width
X Resolution
White Balance
Serial Number
FlashPix Version
Subsecond Time Digitized
Y Resolution
Color Model
FNumber
Image Number
Focal Length
Pixel Width
Subsecond Time
Focal Plane Resolution Unit
Depth
Flash Compensation
Exposure Program

What You'll Learn

- Create your own camera experience
- Build your own image picker
- Interact with photos and videos in new ways

Make Your Application Stand Out

- Build and design your own camera controls
- Take advantage of the flexibility of the AssetsLibrary framework
- Implement a custom image picker for your application
- Enrich your application with access to full-size images
- Take it to the next level with system integration
- Create amazing media visualization applications using metadata

More Information

Mark Malone
Integration Technologies Evangelist
mgm@apple.com

Documentation
iPhone OS Developer Documentation
http://developer.apple.com/

Apple Developer Forums
http://devforums.apple.com

Related Sessions

Discovering AV Foundation	Presidio Tuesday 2:00PM
Editing Media with AV Foundation	Presidio Tuesday 3:15PM
Using the Camera with AV Foundation	Presidio Tuesday 4:30PM
Customizing Maps with Overlays	Mission Thursday 11:30AM
Discovering AV Foundation (Repeat)	Nob Hill Thursday 4:30PM

Labs

Camera and Photo Library Lab	Graphics and Media Lab D Thursday 10:15AM
Map Kit Lab	Application Frameworks Lab B Thursday 2:00PM
AV Foundation Lab	Graphics and Media Lab B Friday 11:30AM

Q&A


WWDC10