



# REDCap External Modules

Luke Stevens 03-Jun-2019

<https://doi.org/10.25374/MCRI.8202398>

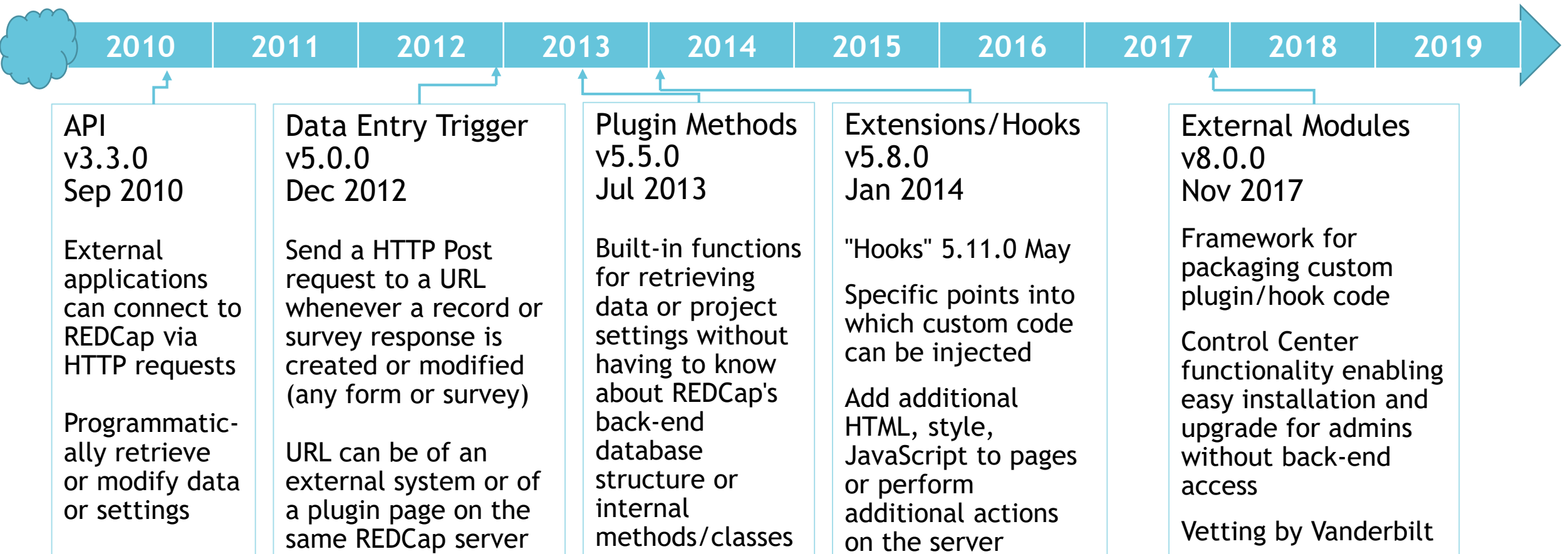
# Agenda

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- Some History
  - Jargon busting: DETs, plugins, hooks, ...
  - Enter External Modules
- Finding and Deploying External Modules
- Some Cool (IMO!) Examples
- Anatomy of an External Module
  - What's under the skin
  - A simple example

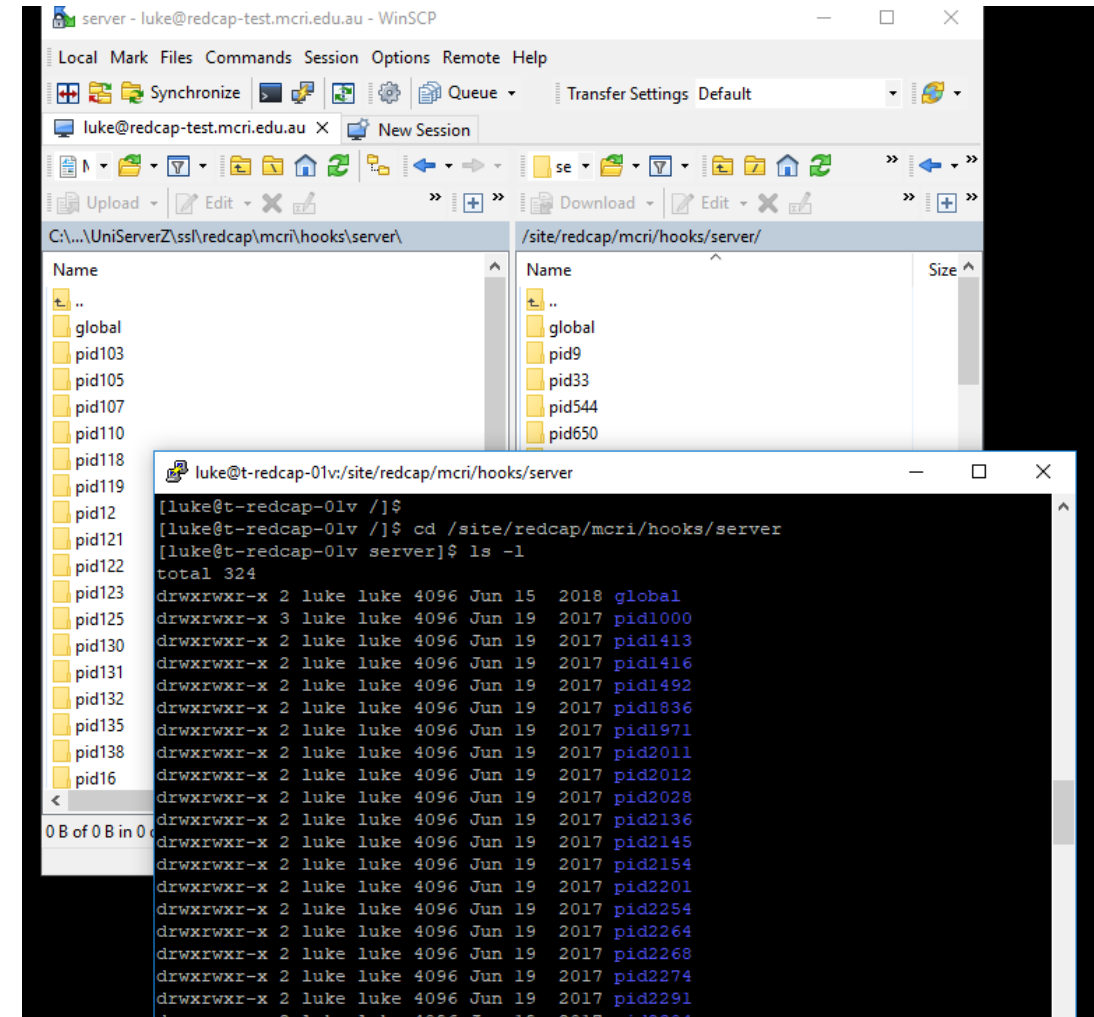
# A History Lesson

## A timeline of REDCap's customisation capabilities (and jargon buster!)



# Before External Modules

- API, DET, plugin methods, hooks provided large degree of customisability.
- Customisability became a key strength of REDCap:
  - A behaviour not to your liking? Change it!
  - A new, unusual requirement? Build it!
  - Better fitting institutions' specific needs.
- BUT!
  - Installation and maintenance requires administrator to have server access (or a responsive IT dept!)
  - Discovery and availability limited to Consortium users
  - Mechanisms for support and troubleshooting, and for release of fixes and new versions were "informal"



## External Modules to the Rescue


- The "External Modules Framework" as a core component of REDCap does not actually extend the customisation potential!
- But does bring major benefits to both developers and institution administrators:
  - Standardising how customisations are developed (class inheritance) and configured (config.json).
  - Formalising how code is packaged and released i.e. using GitHub repositories and releases. <https://github.com/topics/redcap-external-module>
  - Facilitates sharing and discovery via the REDCap Repo.
  - Makes installation and upgrading easy from the REDCap Control Center - no server access required.
- Spreads the benefits of consortium members' creativity and inspiration to all.



# Discovering and Deploying Modules

## ■ Discovery

- Control Center → External Modules → View REDCap Repo
- Mentions in Consortium forum

 View modules available in the REDCap Repo



**Answer by andy.martin** · May 01 at 02:53 AM

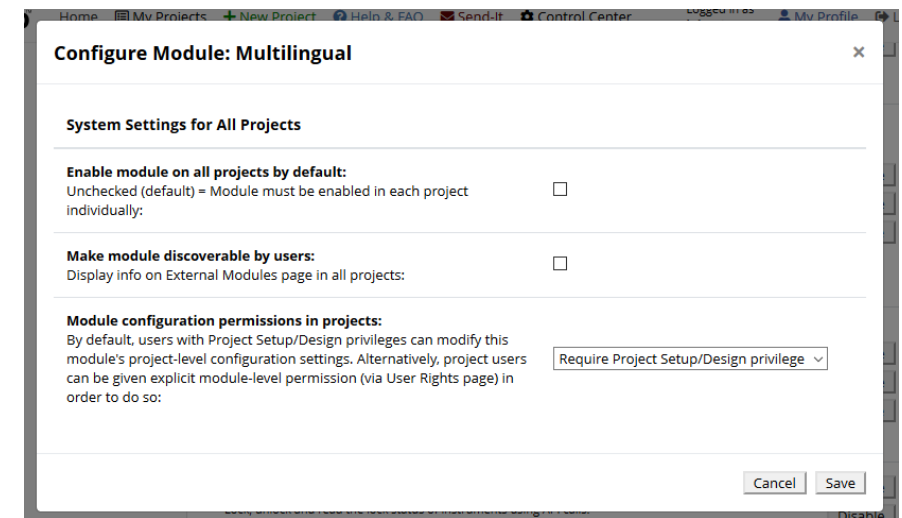
For the record., the survey ui tweaks em offers this option in probably the easiest configuration.

## ■ Deploying

- Download and install via REDCap Repo
- No warranty! Dev/Test environment first, not Production!
- Pilot in one or two projects before making discoverable

## ■ Production Configuration

- Enable on all projects by default
- Make discoverable by users
- Module configuration permissions



**Configure Module: Multilingual**

**System Settings for All Projects**

**Enable module on all projects by default:**  
Unchecked (default) = Module must be enabled in each project individually: ☐

**Make module discoverable by users:**  
Display info on External Modules page in all projects: ☐

**Module configuration permissions in projects:**  
By default, users with Project Setup/Design privileges can modify this module's project-level configuration settings. Alternatively, project users can be given explicit module-level permission (via User Rights page) in order to do so: Require Project Setup/Design privilege ▾

Cancel Save

# Cool Example #1: Form Render Skip Logic

## Different forms by randomised allocation

- Randomisation allocation, randalloc, is the "Control field".
- Form "Intervention group data":
  - Show only when randalloc = '1', Intervention
- Form "Control group data":
  - Show only when randalloc = '2', Control
- No longer need to use "arms" or in-form message for "This form is not required".
- Can still import data or access via URL edit.
- Note that event settings do not get copied when copying project with EM settings:
  - Event IDs from source project are invalid in the copy

1. Field: randalloc - Randomised allocation ▾

1. Default/fallback value:

1.1. Branching logic:

1.1. Condition: = 1

1.1.1. Target forms: intervention\_group\_data ▾

1.1. Restrict this rule to specific events: ☐

1.2. Branching logic:

1.2. Condition: = 2

1.2.1. Target forms: control\_group\_data ▾

Record ID	Randomisation	Intervention group data	Control group data	Common data
<u>1</u> Intervention	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<u>2</u> Control	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
<u>3</u> Intervention	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<u>4</u> Control	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

## Cool Example #2: MySQL Simple Admin

### Production change with "critical" issues

- Sometimes we can see there is not likely to be any problem in approving a change containing "critical issues", e.g.
  - Affected record(s) look like test/dummy
  - Project title contains e.g. "Copy"/"Test"/"Practice"
- Module configuration enables saving a query.
  - Plug in project\_id and field\_name(s) and run.
  - Obtain listing of affected records and values.
  - Confirm the changes.
  - Include results in the confirmation message to the user:  
"here is the data you lost..."
- (Module allows read-only queries only)

1. Custom SQL Queries: +  
-

1. Title:

\* must provide value

Prod changes data affected

1. Query:

\* must provide value

```
select *  
from redcap_data  
where project_id = 9999  
and field_name in (  
'?'  
)
```

### Fields to be DELETED:

- parent\_pi\_postcode "Postcode" (1 records affected)

#### Custom Queries:

Prod changes data affected

[Recent project activity \(redcap\\_log\\_event\)](#)

[Recent user activity \(redcap\\_log\\_event\)](#)

[Recent user activity \(redcap\\_log\\_view\)](#)

[Users and roles by project](#)

#### Query:

```
select *  
from redcap_data  
where project_id = 3805  
and field_name in (  
'parent_pi_postcode'  
)
```

Execute

#### REDCap database tables:

```
select * from redcap_data where project_id = 3805 and field_name in ( 'parent_pi_postcode' )  
limit 0,500
```

project_id	event_id	record	field_name	value	instance
3805	12214	1	parent_pi_postcode	1234	NULL



# Honourable Mentions

- Admin Dashboard
  - Built-in and custom SQL queries
- Survey UI Tweaks
  - Customise button wording (useful for auto)
  - Hide the "question number" space!
- Instance Table
  - Descriptive text field with table of data for repeating event/form instances
- DAG Switcher
  - Enable users to switch between Data Access Groups (or to "No assignment")

## Admin Dashboard

[Projects by User](#) [Users by Project](#) [Research Projects](#) [Development Projects](#) [All Projects](#)

[Projects with External Modules](#) [Credentials Check \(Fields\)](#)

[Settings](#) [Export CSV File](#)

### Projects with External Modules

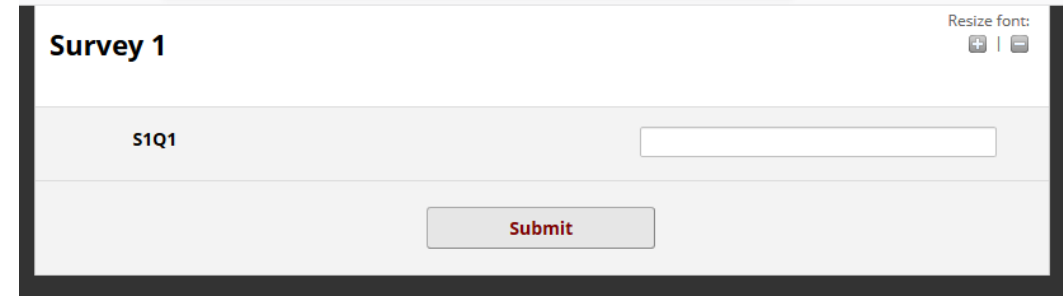
List of External Modules and the projects they are enabled in.

1 - 16 / 16 rows 100

Module Title	Project Titles	User Emails	Total Projects
annotated crf	PPOIT-3 Study Phase REDCap II: Training Project (Demonstration)	<div>blg@unimelb.edu.au</div> <div>blg@unimelb.edu.au</div> <div>blg@unimelb.edu.au</div> <div>blg@unimelb.edu.au</div>	2

# Honourable Mentions

- Admin Dashboard
  - Built-in and custom SQL queries
- Survey UI Tweaks
  - Customise "Submit" wording (useful for auto-continue)
  - Hide the "question number" space!
- Instance Table
  - Descriptive text field with table of data from repeating event/form instances
- DAG Switcher
  - Enable users to switch between Data Access Groups (or to "No assignment")

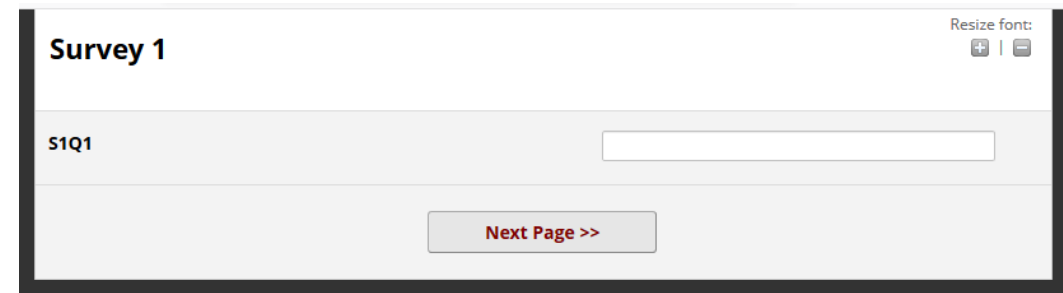


Survey 1

Resize font: + -

S1Q1

Submit



Survey 1

Resize font: + -





S1Q1

Next Page >>

# (Not so) Honourable Mentions

- Admin Dashboard
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## Repeating Instruments

Contact Log		
Non-schedule		
1		07-05-2018 20:10 Arrange visit
2		12-05-2018 15:05 Other (specify)
3		07-06-2018 15:05 Arrange visit
4		08-03-2019 14:05 Other (specify)

### Instance Tables

Data Access Group: **DAG1** ?

Editing existing Record ID **DAG1-001**





Event Name: **Baseline**

Record ID DAG1-001

Repeating Forms

Table of repeating form instances: Non-schedule/Contact Log

Show 10 entries Search:

#	Date/time of contact attempt	Contact made by	Purpose of contact	Specify other purpose	Results of contact attempt	Form Status
<u>1</u>	2018-05-07 20:10	Alice (1)	Arrange visit (1)		Success - spoke with P1	
<u>2</u>	2018-05-12 15:05	Bob (2)	Other (specify) (9)	Check some info re. appointment	Line engaged	
<u>3</u>	2018-06-07 15:05	Alice (1)	Arrange visit (1)		Visit 2 arranged	
<u>4</u>	2019-03-08 14:05	Alice (1)	Other (specify) (9)	test	success? "almost"	

Showing 1 to 4 of 4 entries

Previous 1 Next

+ Add new

# (Not so) Honourable Mentions

- Admin Dashboard
  - Built-in and custom SQL queries
- Survey UI Tweaks
  - Customise button wording (useful for auto-continue)
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  - Descriptive text field with table of data from repeating event/form instances
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  - Enable users to switch between Data Access Groups (or to "No assignment")

	Users			
	Irdemo	Irtest	luke.stevens	luke1
Data Access Groups				
[No Assignment]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site A	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Site B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

*i* Current Data Access Group: **Site A** Switch

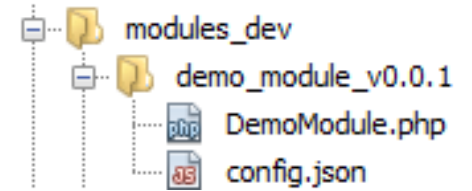
**Switch Data Access Group** ✕

Select the DAG to switch to:

Site C ▼

Cancel Ok

# Anatomy of an External Module



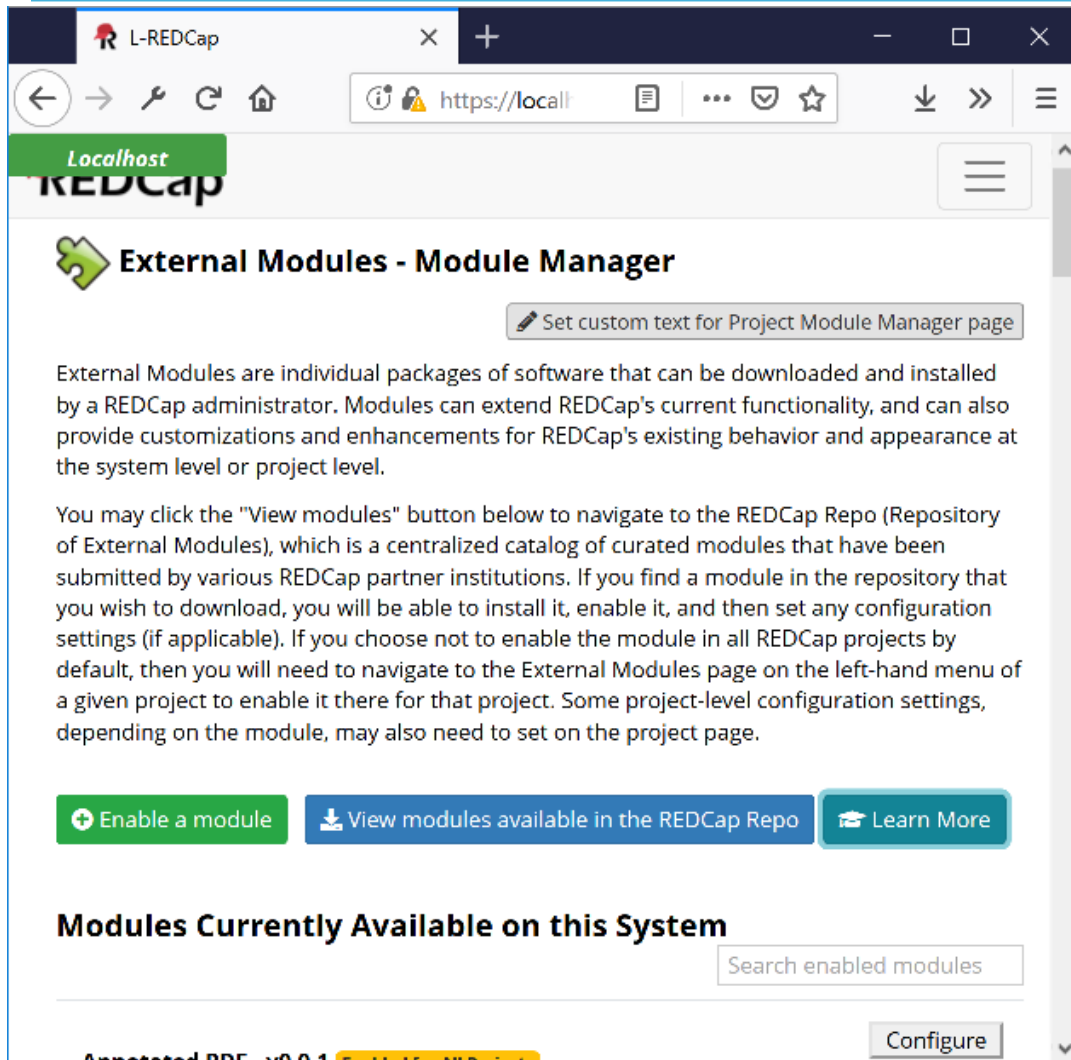
## config.json

```
1 {
2   "name": "Demo Module",
3   "description": "Demo for SLHD REDCap Day 2019",
4   "namespace": "MCRI\\DemoModule",
5   "authors": [
6     {
7       "name": "Luke Stevens",
8       "email": "luke.stevens@mcric.edu.au",
9       "institution": "Murdoch Children's Research Institute"
10    }
11  ],
12  "permissions": [
13    "redcap_every_page_top"
14  ],
15  "enable-every-page-hooks-on-system-pages": true,
16  "links": { },
17  "no-auth-pages": [ ],
18  "system-settings": [
19    {
20      "key": "button-label",
21      "name": "Button Label",
22      "type": "text",
23      "required": true
24    },
25    {
26      "key": "button-url",
27      "name": "Button URL",
28      "type": "text",
29      "required": true
30    }
31  ],
32  "project-settings": [ ]
33 }
34 }
```

## DemoModule.php

```
1 <?php
2 /** REDCap External Module: Demo Module ...5 lines */
3
4 namespace MCRI\DemoModule;
5 use ExternalModules\AbstractExternalModule;
6 class DemoModule extends AbstractExternalModule
7 {
8   public function redcap_every_page_top($project_id) {
9     if (strpos(PAGE, 'ExternalModules/manager/control_center.php') > 0) {
10       $btnLbl = $this->getSystemSetting('button-label');
11       $btnUrl = $this->getSystemSetting('button-url');
12       ?>
13       <button id="demo-module-button" class="btn btn-info btn-sm">
14         <span class="fas fa-graduation-cap" aria-hidden="true"></span>
15         <?php echo $btnLbl;?>
16       </button>
17       <style type="text/css">
18         #demo-module-button { display: none; margin-left:5px; }
19       </style>
20       <script type="text/javascript">
21         $(document).ready(function() {
22           $('#demo-module-button')
23             .on('click', function() {
24               window.open('<?php echo $btnUrl;?>', '_blank');
25             })
26             .insertAfter('#external-modules-download-modules-button')
27             .show();
28         });
29       </script>
30       <?php
31     }
32   }
33 }
34 }
```

# Anatomy of an External Module



- Write button HTML to page
- Write style settings to page
- Write JavaScript function to page
  - Attach click handler to button
  - Move the button to where we want it
  - Unhide it
- Click the "Learn More" button and a new tab opens with the page you specify in the module configuration.
- Full documentation by Vanderbilt available at <https://github.com/vanderbilt/redcap-external-modules/blob/testing/docs/official-documentation.md>
- Look at modules' GitHub repositories for patterns to use in your own.

# Thank you. Any questions?

And thanks to the REDCap team at Vanderbilt University

Title: Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support

Author: Paul A. Harris, Robert Taylor, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde

Publication: Journal of Biomedical Informatics

Publisher: Elsevier

Date: April 2009

DOI: <https://doi.org/10.1016/j.jbi.2008.08.010>

