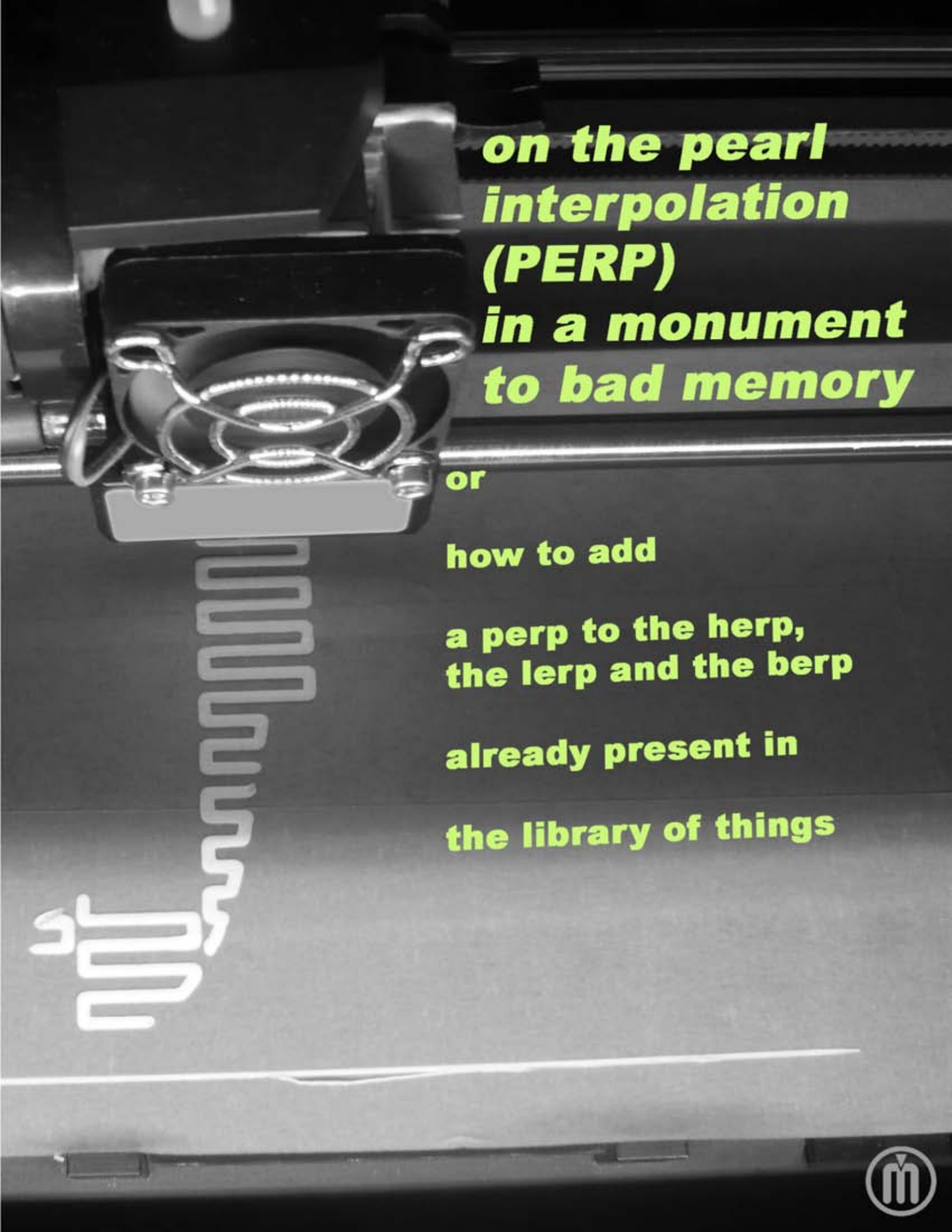

on the pearl interpolation (PERP) in a monument to bad memory

or

how to add

a perp to the herp, the lerp and the berp

already present in

the library of things

emily
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mobile
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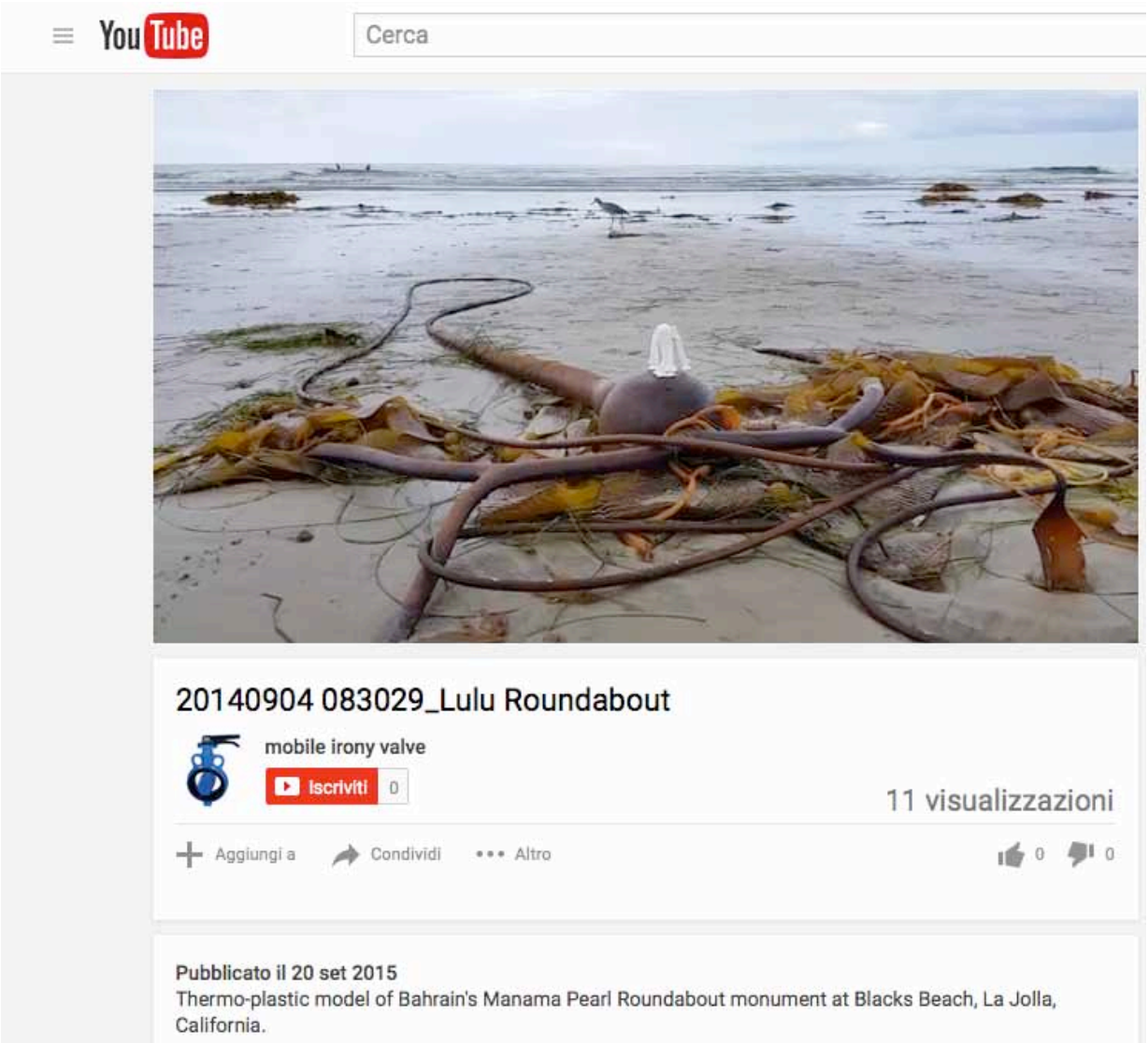


Fig. 1 Screenshot of performance-documentation posted on Youtube: thermo-plastic model of Bahrain's Manama Pearl Roundabout monument left on the bloated bulb of *nereocystis luetkeana* kelp (mermaid's bladder or bullwhip kelp) at Blacks Beach in La Jolla, California. A marbled godwit crosses the frame in the background. To watch video, visit: https://www.youtube.com/watch?v=AnSMFKjwLx0

The *PERP* tutorial was originally circulated on March 28, 2014 by the Gulf Labor Coalition.

"On the Pearl Interpolation (PERP) in a Monument to Bad Memory" was Week 33 contribution of MOBILE IRONY VALVE (Emily Verla Bovino) to the Gulf Labor Artist Coalition's "Who's Building the Guggenheim Abu Dhabi?"

Cited in *The Gulf: High Culture, Hard Labor,* edited by Andrew Ross. (New York: OR Books, 2015); Book Launch at the Venice Biennale, July 29, 2015 on the dock outside the Peggy Guggenheim Collection in Venice, Italy.

First edition published 2014.

Second edition published 2015. Editorial assistants: Jane Kang and Harold dela Cruz.

Third edition published 2016. Editorial assistants: Codie Vierra and Genesis Hill.

ON THE PEARL INTERPOLATION (PERP) IN A MONUMENT TO BAD MEMORY

For accompanying video, visit: http://peddlers-and-bandits.blogspot.com/2014/05/blog-post.html

PERP is a speculative design exercise for the creation of a complex of towers to house a fictional migrant worker cooperative on Manama harbor in Bahrain. The design exercise is part of Gulf Labor Coalition actions against the exploitation of migrant labor in Persian Gulf mega-cities. It was inspired by the resemblance between Manama's fallen Pearl (Lulu) Roundabout monument after its destruction and deconstructivist architect Frank Gehry's designs for the Guggenheim Museum, across the Gulf from Manama, in the United Arab Emirates (UAE) city of Abu Dhabi.

Fig. 2 (top; from left to right) Satellite images of protest encampments occupying the Pearl Roundabout in Manama, Bahrain; the razing of the monument; a plastic model made from pausing a computer-animated re-enactment of the monument's collapse at the moment it may have killed Riaz Ahmed, a Pakistani migrant worker who operated one of the demolition cranes; (bottom, from right to left) construction at the Guggenheim Museum site on Saadiyat Island in Abu Dhabi is delayed while Gulf Labor coalition artists protest the complicity of cultural institutions with exploitative labor practices; (bottom; far left) deconstructivist architect Frank Gehry's design for the Guggenheim.

Fig. 3 Manama, Bahrain (left) and Saadiyat Island in Abu Dhabi (UAE) (right) facing each other across the Persian Gulf. Manama is the site of the Pearl Roundabout monument; Abu Dhabi is the site of the Guggenheim Museum mega-project.

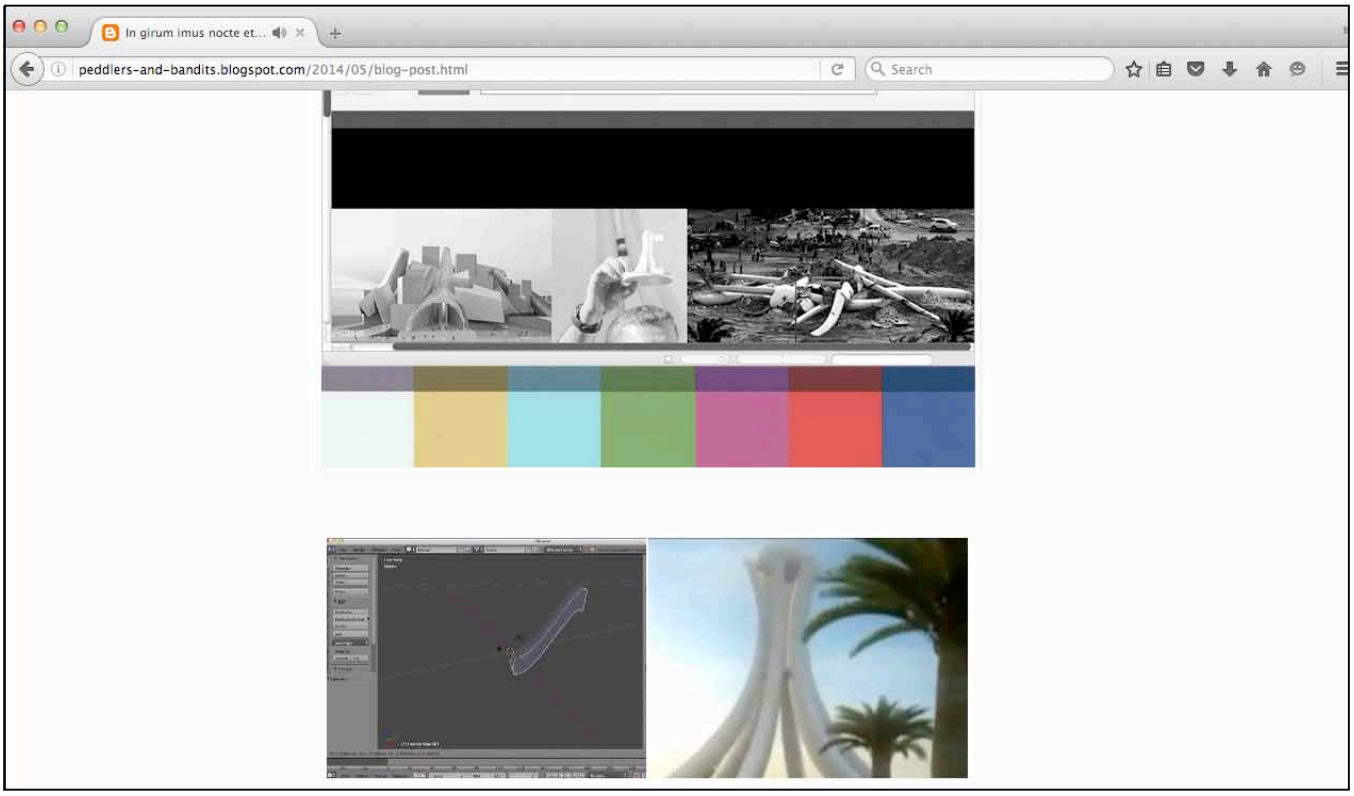


Fig. 4 Screenshot of a two-channel video edited from (bottom right) Pearl Roundabout monument footage gathered from Youtube and (bottom left) performance-documentation of the *PERP* tutorial in the open-source animation software *Blender*. The videos were circulated as 'Week 33' in the Gulf Labor Coalition initiative, *52 Weeks*. 'Week 33' circulated the *PERP* tutorial online among an international network of Gulf Labor Coalition supporters. 'Week 33' was also published in *The Gulf: High Culture/Hard Labor* edited by Andrew Ross (OR Books, 2015). In this screenshot, edited Pearl Roundabout monument footage gathered from Internet ethnography (bottom right) includes a clip of the 're-animated' monument from a 3D simulation created by a Youtube user. Meanwhile, performance-documentation of the *PERP* tutorial (bottom left) shows the hermite slide that will be used to recreate one of the lower support 'sails' in the *PERP* Pearl Monument design. (To watch, visit: http://peddlers-and-bandits.blogspot.com/2014/05/blog-post.html).

THE ROUNDABOUT & THE MUSEUM: A TALE OF TWO GULF URBANISMS
BETWEEN MANAMA, BAHRAIN *& ABU DHABI, UNITED ARAB EMIRATES (UAE)*

pre-oil	fishing and boat-building determine the urban structure of manama.
	abu dhabi is a bedouin sheikhdom of clustered fishing and pearl settlements.
oil-era	oil represents 65% of the government income in manama after 1937.
	abu dhabi's first oil exports in 1962 drive its dramatic urbanization.
auto-era (1960s)	the number of cars in manama increase from 395 (1944) to 18,372 (1970); a system of traffic roundabouts is adopted for manama to improve circulation.
	abu dhabi is called an 'instant city' with "boulevards of parisian scope."
post-	bahrain transitions from british colony to independent nation.
colony	*the united arab emirates (UAE) emerge as a political entity and abu dhabi joins.*
post-oil	tourism and finance are supposed to replace oil in the new bahrain.
	master plans of abu dhabi ensure that expatriate labor will not put down roots.
network	new highways and causeways emphasize manama's primacy in bahrain.
	conservative abu dhabi uses the cosmopolitan model of dubai to develop.
gulf-era (1982)	the pearl roundabout monument is built to honor a meeting of gulf states in manama; the monument's large cement sphere memorializes the pearl industry of pre-oil bahrain; its six white 'sails' represent: bahrain, kuwait, oman, qatar, saudia arabia, UAE.
mega-	manama develops the bahrain financial harbor and world trade center.
citites (2004)	*abu dhabi I ncludes a guggenheim museum in its designs for saadiyat island.*
tower-	luxury residential high rises are built near the lulu roundabout in 2008.
up (2008)	*researchers investigate exploitation of migrant workers in abu dhabi.*
lulu-era	anti-government protestors occupy the pearl roundabout with encampments; in four days of battles over the contested space, seven civilians die.
(2011)	*in abu dhabi, bangladeshi workers are deported for labor protests;* *gulf labor coalition artists visit labor camps at the guggenheim museum site;* *architect frank gehry discusses his plans for the museum at abu dhabi art fair.*
post-lulu	the pearl roundabout is callled "monument to bad memory" by a government minister; martial law is declared and the roundabout is razed by four machines; the pearl monument's collapse crushes riaz ahmed, a pakistani crane operator.
	gulf labor coalition artists demand the guggenheim ensurse migrant labor rights; *guggenheim abu dhabi is in suspension, said slotted for completion in 2017.*

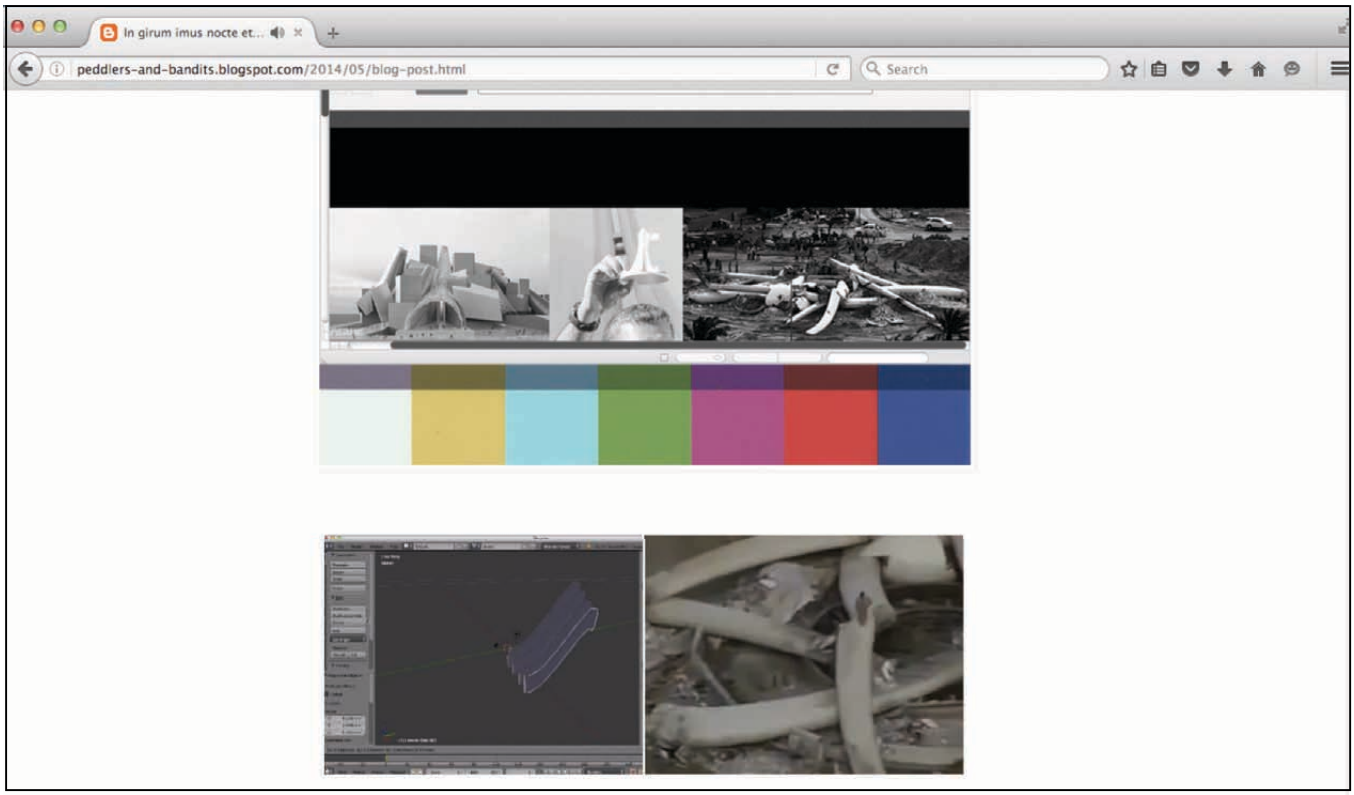


Fig. 5 Screenshot of a two-channel video edited from (bottom right) Pearl Roundabout monument footage gathered from Youtube and (bottom left) performance-documentation of the *PERP* tutorial in the open-source animation software *Blender*. The videos were circulated as 'Week 33' in the Gulf Labor Coalition initiative, *52 Weeks*. 'Week 33' circulated the *PERP* tutorial online among an international network of Gulf Labor Coalition supporters. 'Week 33' was also published in *The Gulf: High Culture/Hard Labor* edited by Andrew Ross (OR Books, 2015). In this screenshot, edited Pearl Roundabout monument footage gathered from Internet ethnography (bottom right) includes documentary footage of the monument's destruction. The video still included herein shows a person walking down one of the monument's former 'sails,' a rib-like structure that previously supported the sculpture's central 'pearl,' a concrete sphere. Meanwhile, performance-documentation of the *PERP* tutorial shows four of the hermite slides used to recreate these support 'sails' in the *PERP* Pearl Monument design.

TUTORIAL: BUILD, ANIMATE AND PRINT *PERP* WITH *BLENDER* AND *MAKERBOT*

STEP ONE: Open Source Animation Suite is Downloaded and Installed

URL: http://www.blender.org/download/

- select appropriate package for operating system
- download *Blender 2.76-rc2*
- install *Blender 2.76-rc2*

STEP TWO: Free Software for Desktop 3D Printer is Downloaded and Installed

URL: http://www.makerbot.com/desktop

- select appropriate package for operating system
- click *Download*
- download *Makerware* 3.8.1
- install *Makerware* 3.8.1 (Makerbot Desktop)

STEP THREE: Things to Become PERP Objects are Found and Downloaded

URL: http://www.thingiverse.com

- in Search field, type “hermite”
- select *OpenScad Surface Solids…,* dated Jun 17, 2011
- click *download this thing!*
- save file: *hermite_slide.stl* in default download folder

STEP FOUR: *Blender* is Opened and Pop-Up Window for Animation Suite Appears

Open *Blender 2.76-rc2*

- Click off pop-up screen anywhere in *Blender 2.76* interface window
- *Blender 2.76* pop-up screen disappears

STEP FIVE: Cube is Deleted from Main User Window in Animation Suite

in *Outliner* window (top right of main user window)

- click left button in tool bar strip (left of *View*) and select *Outliner*
- in *Scene* drop-down: select *Cube*
- go to *Tools* tab (left of main user window): under *Edit*; click *Delete*
- (OR with *Cube* selected in *Outliner* window, right click and select *Delete* from drop-down menu)

STEP SIX: Things to Become PERP Objects are Scaled and Duplicated

1. click *File* (on left side of *Blender* interface main tool bar): select *Import*; in drop-down menu, click.*Stl (.stl)*
   - under *System Bookmarks* (left side of import pop-up menu): find default download folder / search for downloaded file: *hermite_slide.stl*
   - select *hermite_slide.stl* / hit Enter (or click *Import STL* on right of file bar)

2. to learn to zoom in and out on object; click anywhere in main user window
   - to zoom out from object*:* hit – button on keyboard;
   - to zoom in on object: hit + button on keyboard;
   - (OR with mouse, to zoom in and out: hold left click and scroll on wheel or touch pad)

3. in *Outliner* window (top right of main user window)
   - select *Hermite Slide* (object has orange outline)
   - *troubleshoot:* do <u>not</u> expand *Hermite Slide*; if *Hermite Slide* has been expanded, two *Hermite Slide* options will appear in the pop-up window; if this happens, select the *Hermite Slide* on top (the first) <u>not</u> the one on the bottom

4. in *Properties* window (right of main user window, under *Outliner*)
   - click *Scene* button (third button from left in button-tool bar);
   - select *Units* (second option under *Scene* in drop-down window;
   - click *Metric* button (second button from left in button-tool bar);
   - in *Metric* drop-down menu, enter value: Scale: 0.002

5. move cursor into main user window; click once and hit *N* button on keyboard
   - pop-up window appears on right of main user window;
   - in pop-up window: select *Transform*; find *Dimensions* and enter values:

     X: 1.8 mm
     Y: 5 cm
     Z: 4.5 cm

6. in *Outliner* window, *Hermite Slide* object must be selected (object has orange outline);
   - go to *Tools* tab (left of main user window); under *Edit*, click *Duplicate*;
   - any move of mouse will move object: to position duplicated *Hermite Slide* (named *Hermite Slide.001*), move mouse or touch pad, and left click or hit Enter on keyboard;

7. in *Outliner* window, select *Hermite Slide.001* (object has orange outline);
   - go to *Tools* tab (left of main user window); under *Edit,* click *Duplicate*;
   - any move of mouse will move object, to position duplicated *Hermite Slide* (named *Hermite Slide.002*)*,* move mouse or touch pad, and left click or hit Enter on keyboard;

8. in *Outliner* window, select *Hermite Slide.002* (object has orange outline);
   - go to *Tools* tab (left of main user window); under *Edit,* click *Duplicate*;
   - any move of mouse will move object, to position duplicated *Hermite Slide* (named *Hermite Slide.003*)*,* move mouse or touch pad, and left click or hit Enter on keyboard;

9. in *Outliner* window, select *Hermite Slide.003* (object has orange outline);
   - go to *Tools* tab (left of main user window); under *Edit,* click *Duplicate*;
   - any move of mouse will move object, to position duplicated *Hermite* Slide (named Hermite *Slide.004*)*,* move mouse or touch pad, and left click or hit Enter on keyboard;

10. go to *Create* tab (left of main user window, under *Tools* tab)
    - under *Add Primitive*, click *UV Sphere* mesh;
    - the *Add UV Sphere* pop-up menu appears (left of main user window);
    - Under *Add UV Sphere*, enter values:

      Segments: 100
      Rings: 40

11. there are now five objects – *Hermite Slides* – in the main user window

12. go to *Dimensions* in *Transform* pop-up menu (right of main user window)
    - under *Dimensions*, enter values

      X: 2 cm (type 'cm' for proper unit of measurement)
      Y: 2 cm (type 'cm' for proper unit of measurement)
      Z: 2 cm (type 'cm' for proper unit of measurement)

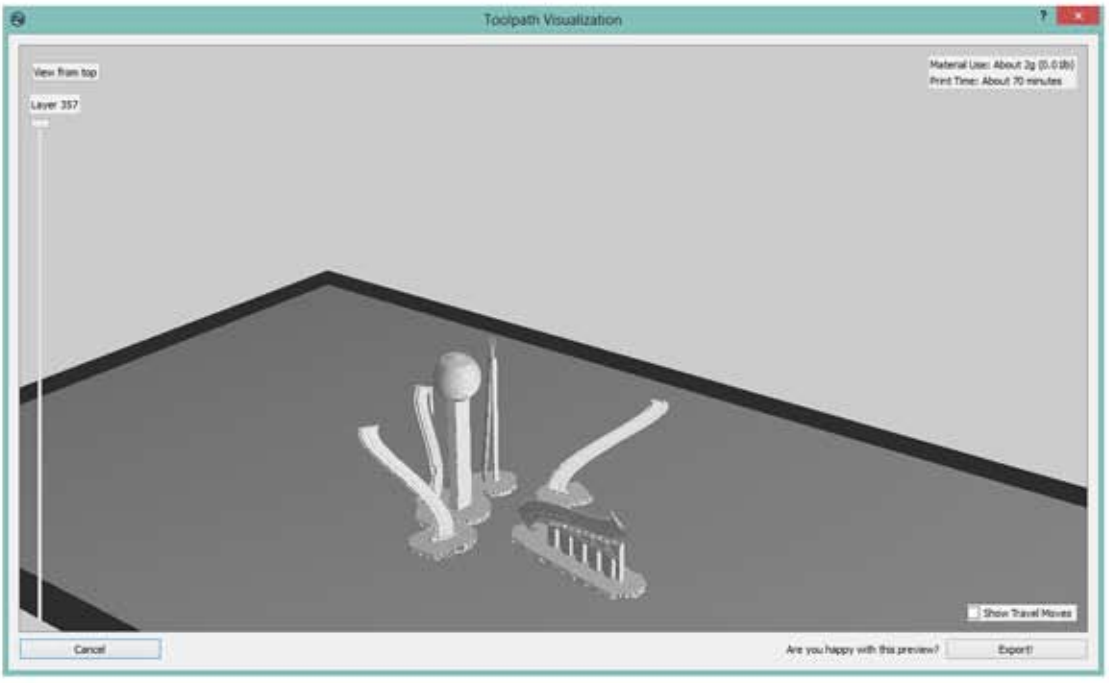


Fig. 6 Screenshots from Blender and MakerBot Desktop: building, animating & printing PERP, the Pearl Interpolation in a Monument to Bad Memory (mage: 2014).

STEP SEVEN: Five Hermite Slides and a UV Sphere are Rotated and Moved into Position with Programmed Coordinates (or see *Manual Option* below)**

1. in *Outliner* window (top right of main user window), select *Hermite Slide*;
   - go to *Transform* pop-up window (left of *Outliner* window; right of main user window);
   - (IF pop-up window is hidden, move cursor into main user window, click once and hit *N* button on keyboard);
   - under *Location*, enter values:

     X: -2.97973cm
     Y: -5.70065cm
     Z: -5.2873mm

   - under *Rotation,* enter values:

     X: 37°
     Y: 0°
     Z: 0°

2. return to *Outliner* window; select *Hermite Slide.001*;
   - go to *Transform* pop-up window;
   - under *Location*, enter values:

     X: -1.41613cm
     Y: 1.32991mm
     Z: -2.6245mm

   - under *Rotation*, enter values:

     X: 38°
     Y: 0°
     Z: 157°

3. return to *Outliner* window; select *Hermite Slide.002*;
   - go to *Transform* pop-up window;
   - under *Location*, enter values:

     X: -5.1404cm
     Y: -1.69929mm
     Z: -4.73544mm

   - under *Rotation*, enter values:

     X: 36°
     Y: 0°
     Z: -138°

4. return to *Outliner* window; select *Hermite Slide.003*;
   - go to *Transform* pop-up window;
   - under *Location*, enter values:

     X: -5.06875cm
     Y: -3.28023cm
     Z: -8.05279mm

   - under *Rotation*, enter values:

     X: 70°
     Y: 12°
     Z: 12°

5. return to *Outliner* window; select *Hermite Slide.004*;
   - go to *Transform* pop-up window;
   - under *Location*, enter values:

     X: -7.29429mm
     Y: -2.94362cm
     Z: -6.19965mm

   - under *Rotation*, enter values:

     X: 46°
     Y: 0°
     Z: 80°

6. return to *Outliner* window; select *Sphere*;
   - go to *Transform* pop-up window;
   - under *Location*, enter values:

     X: -2.8864cm
     Y: -2.5994cm
     Z: 5.16997cm

   - under *Rotation*, enter values:

     X: 0°
     Y: 0°
     Z: 0°

7. *troubleshoot*: if there is a slide that appears to be in the wrong place, re-enter the location data even if it seems correct; also, check that measurment units are correct (i.e. cm or mm)

8. go to File / select Save As / name file: *PERP.blend* / click *Save As Blender* File

STEP EIGHT: Roundabout Object Cylinder is Added to Slides and Sphere

/ go to *Create* tab (left of main user window, under *Tools* tab) /

- under *Add Primitives*, select *Cylinder*;
- *Add Cylinder* pop-up window appears;
- Under *Add Cylinder*, change values to:

  Vertices: 100

- to scale and position *Cylinder* object with programmed coordinates:
- go to *Transform* pop-up window (if hidden, move cursor into main user window, click once and hit *N* button on keyboard);
- under *Dimensions*, enter values:

  X: 10 cm
  Y: 10 cm
  Z: 1 mm

- *under Location,* enter values:

  X: -2.92204 cm
  Y: -2.72976 cm
  Z: -1.42643 cm

- (OR, to position *Cylinder* manually, click blue Z-axis arrow in main user window and move *Cylinder* object to desired location under standing slides and sphere)

STEP NINE: To Animate Collapse, Plane Mesh is Added to Slides and Sphere

go to *Create* tab (left of main user *window*, under *Tools* tab)

- under *Add Primitives*, select *Plane*;
- to position *Plane* object with programmed coordinates:
- go to *Transform* pop-up window (if hidden, move cursor into main user window, click once and hit *N* button on keyboard);
- under *Location,* enter values:

X: 0 m
Y: 0 m
Z: -1.54914cm

- (OR, to position *Plane* manually, click blue Z-axis arrow in main user window and move *Plane* object to desired location under standing slides and sphere)

STEP TEN: Correspondences Among Slides and Sphere are Coordinated for Animating

1. in *Outliner* window / select *Plane*;
   - in *Properties* window (under *Outliner* window): click *Physics* button (bouncing ping-pong ball icon: first button on the right of *Properties* toolbar);
   - under *Enable physics for*: click *Rigid Body*
   - in *Rigid Body* pop-up window, change *Type* to *Passive*

2. in *Outliner* window / select *Hermite Slide*
   - in *Properties* window: click *Physics* button
   - under *Enable physics for*: click *Rigid Body*
   - in *Rigid Body* pop-up window, *Type* remains *Active*;
   - check box for *Dynamic*;
   - in *Mass*, enter value:110g
   - under *Rigid Body Collisions*: *Shape* remains *Convex Hull*

3. repeat above procedure for all *Hermite Slide* duplicates (*Hermite Slide.001*, *Hermite Slide.002*, *Hermite Slide.003*, *Hermite Slide.004*)

4. in *Outliner* window / select *Sphere*
   - in *Properties* window: click *Physics* button
   - under *Enable physics for*: click *Rigid Body*
   - in *Rigid Body* pop-up window, *Type* remains *Active*;
   - check box for *Dynamic*;
   - in *Mass*, enter value: 80g
   - under *Rigid Body Collisions*: *Shape* remains *Convex Hull*

STEP ELEVEN: Correspondences Among Slides and Sphere are Animated

to play animation:

- keyboard shortcut: Alt A
- (or go to *Timeline* strip under main user window and hit play button)

STEP TWELVE: Collapse is Paused Along Animation Timeline and Exported

1. to play animation and pause at selected point of collapse:
   - keyboard shortcut to play and pause: Alt A

- (or go to Timeline strip under main user window and hit play/pause button)

2. to print selected point of collapse:
   - in *Outliner* window: select *Plane*; right click and select *Delete*;
   - move cursor into main user window;
   - hold '*B'* letter key down on keyboard, then drag mouse to create a rectangular outline over sphere and slides in main user window

3. go to *File* / select *Export* / click *Stl (.stl)* / click *Export STL* / name: *PERP01.stl*

STEP THIRTEEN: Free Software Makerbot Desktop for 3D Printing is Opened

find downloaded *MakerBot* in *Applications* folder

- open *MakerBot*: select *Prepare* in top black toolbar

STEP FOURTEEN: Monument to Bad Memory is Supported, Rafted, Previewed and Printed

1. go to *File* / select *Add* / find PERP01.stl

2. click on 'axis' button (*Position)* under 'eye' button (*View)* on left side of window
   - click *On Platform*
   - click *Center*
   - troubleshoot: if neither of these options appear, click on the object; if the object is correctly aligned already, it will not move

3. click on 'arrows' button (*Rotate*) under 'axis' button (*Position*)
   - click *Lay Flat*
   - troubleshoot: if this option does not appear, click on the object; if the object is correctly aligned already, it will not move

4. click *Settings* on left under *Prepare* in top black toolbar
   - click *Custom* button on upper right
   - select *Raft; Raft* box should be checked
   - select *Supports and Bridging*: check *Support* and *Extra Support*
   - under *Extra support*:

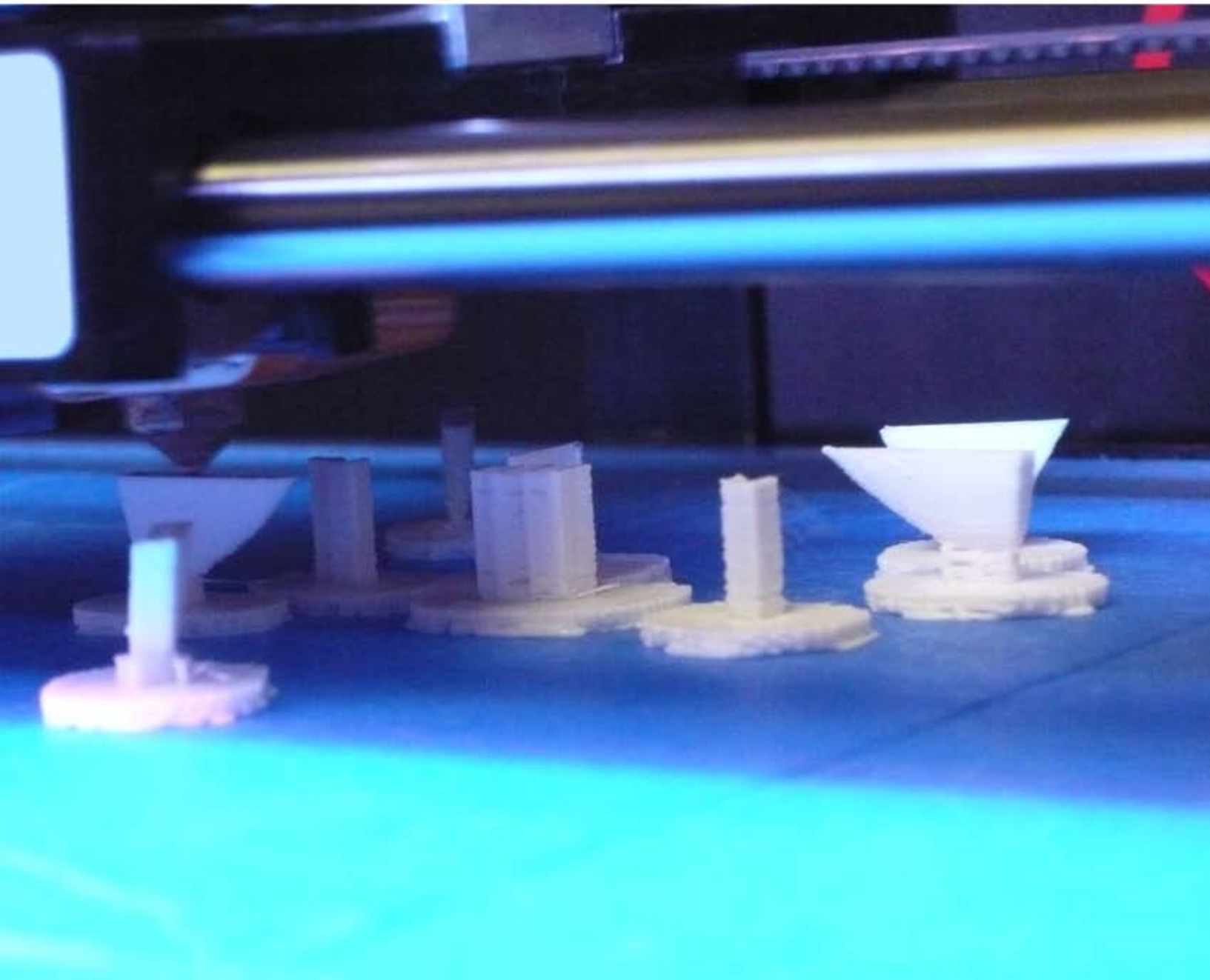
     change *Support Density* to: .60
     change *Support Margin* to: 0.1 mm
     change *Support to Model Spacing* to: 0.1mm
     change *Support Angle* to: 85

   - under *Bridging*: check *Support Bridges*

5. Select *Preview* in top black toolbar
   - view model in print preview
   - rotate, zoom and explore layers: take screenshots of different views
   - troubleshoot: to zoom without a computer mouse: use two fingers on the track pad
   - click *Show Travel Moves*; rotate, zoom and explore layers; take screenshots

Fig. 7 In video documentation of the destruction of the Pearl Rounabout monument that was circulated online, a lone figure was captured walking down one of the former monument's six 'sails.' The 'sails' -- said to represent the six member nations (Bahrain, Kuwait, Oman, Qatar, Saudia Arabia and the UAE) whose leaders had convened at the Gulf Cooperation Council summit in Manama in 1982 -- had previously served as structural support for the monument's concrete 'pearl'. The fallen 'sails' looked like gigantic human ribs and now served as slides, fallen among ruins of a razed roundabout. The form that resulted from destruction was named PERP or the Pearl Interpolation in a Monument to Bad Memory. (Image: digital photograph of various PERP thermo-plastic models, 2014).

Fig. 8 In the spring of 2011, newspaper reports from the region known as “the Gulf” recorded that a monument to “bad memory” at a traffic roundabout named “Lulu” (Pearl) had been razed. In the process, Riaz Ahmed, a Pakistani migrant worker who operated one of the demolition cranes, had been killed. The collapse of the monument occurred four hundred and fifty kilometers away from the building site of a mega-project called “the biggest Guggenheim ever” (Image: digital photograph of thermoplastic model printing in Replicator Makerbot, 2014).



EPI-LOG ETHNO-FICTION:
TRANS-FINITE INTERPOLATIONS IN A MODEL OF BAD MEMORY

For the *PERP* to be added to the *herp*, the *lerp* and the *berp* (three interpolations already present in the Internet library of things) a user named William had to have sat at his kitchen table in front of his laptop. It must have been the month of June. The humidity levels had to drive temperatures to 86 degrees, and the user named William had to have begun modeling a waterslide tube in an open-source design software he called "OpenScad". The user named William had to have identified himself as "a dabbler": he had to have said he worked on software for a large company at a location he called the "Pacific Northwest".

The user named William had to have developed his waterslide using a hermite curve. He had to have described the hermite curve as a curve defined by two endpoints with tangents vectoring to those endpoints. In a *herp*, or hermite interpolation, *splines* or sections of a curve, can be adjusted independently: each section can be made to move in response to its endpoint-constraint. The method of manipulation in which one spline is adjusted independently is sometimes called *trans-finite interpolation*. Trans-finite interpolation is frequently used in the computer-aided design of forms that fly or glide.

While the user named William was sitting at his kitchen table and preparing his waterslide model for a file-sharing site, another user named Haroon was creating a map on a free mapping service. The map made by the user named Haroon featured a series of eight markers: all of the markers were blue and all were linked to videos. The map that the user named Haroon made was labeled "Bahrain protests 16/17 June 2011: Protests purported to have been held overnight on 16 and 17 June 2011."

The map made by the user named Haroon had to have been viewed five thousand five hundred and fifty-three times. The hermite slide made by the user named William had to have been downloaded three hundred and twelve times. The locations cited on the map made by the user named Haroon had to be: Shahrakkan, Sinabis, Sitra, Ma'ameer, Barbar and Bani Jamra. Karzakkan had to appear twice and several of the map's video links had to eventually list as no longer existent. Meanwhile, the hermite slide made by the user named William had to undergo various iterations. In comments associated with the hermite slide, another user reminded the user named William that in colloquial North American English *herp derp* was an expression used to make fun of conversations that sounded like nonsense.

It was at this point that the architect who had designed the model for a mega-project monument called "the biggest Guggenheim yet" would have expected that his model would already have become a building. In a column commissioned for a newspaper, the architect had imagined the "particular issues" that building in the location he called "the Gulf" could, as he described it, "throw up": these issues regarded what he called the "display of art." He noted that a journalist had once called one of his designs "crude curlicues," and he warned that in the monument called "the biggest Guggenheim yet," there might even be "curlicues, too."

In the spring of 2011, newspapers reported a "monument to bad memory" at the Bahrain roundabout called "Pearl" (or "Lulu"): the monument was a sculpture that had 'curled' on 'cue' to collapse. The collapse had occurred four hundred and fifty kilometers across from the mega-project architect's building site. Completion of the architect's monument, the "biggest Guggenheim yet," was delayed while the "monument to bad memory" fell: a bulldozer had deliberately dislocated one of the six 'sails' in the sculpture that held up the monument's central sphere. The sculpture's collapse resulted in a proliferation of miniatures: models of the standing "Pearl" (or "Lulu") were erected at various locations to memorialize the roundabout's erasure. Video of the monument's collapse was circulated on video-sharing sites. In one video, a lone human figure was captured walking down one of the monument's fallen 'sails' which now took the form of what looked like a gigantic human rib. The sail become a rib was now a slide among the ruins of a roundabout monument—ruins called *PERP*, the Pearl Interpolation in a Monument to Bad Memory.

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