# Radiance: 1990-2005

A ramble through my recollections of trying to use radiance in building science and architecture education at Victoria University of Wellington

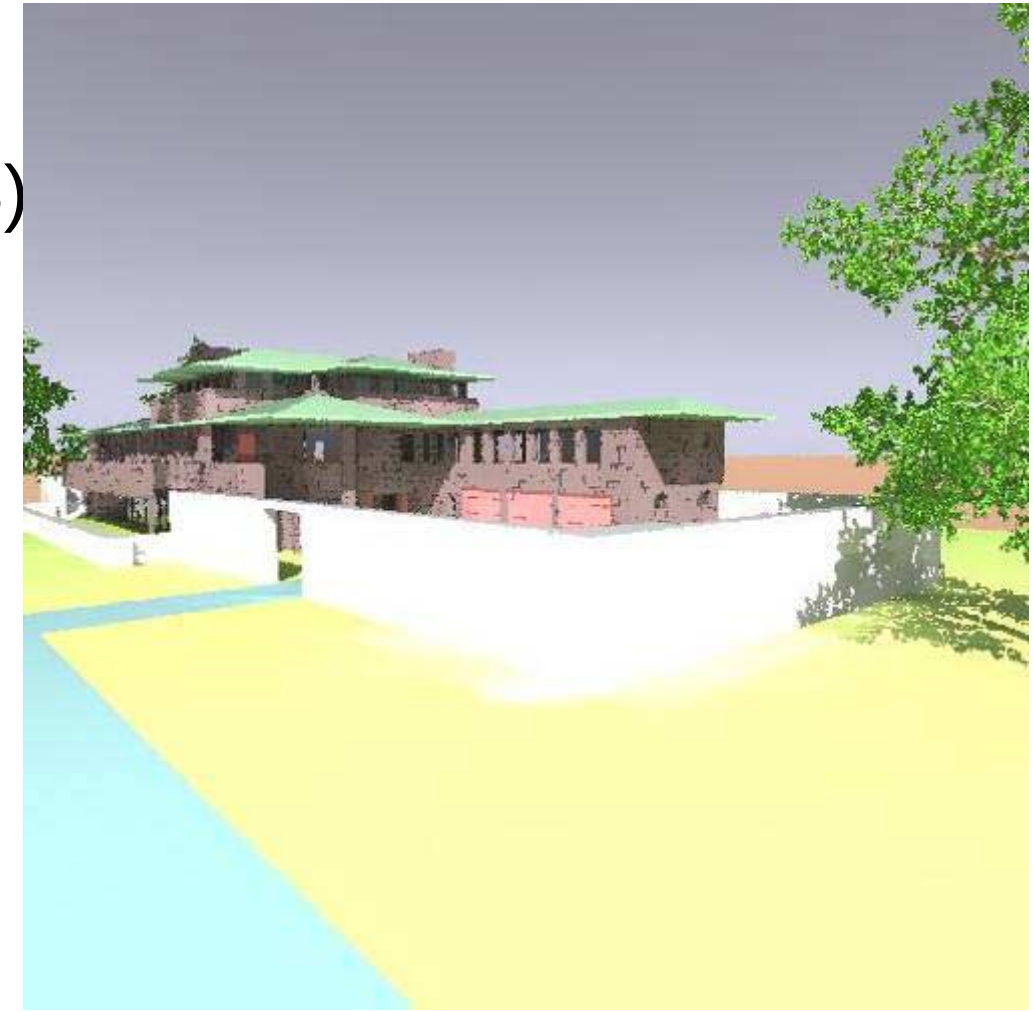
RADIANCE Workshop – McGill Uni – August 2005

# 1991

- David Chambers
  - Optional renderer in CAD class
  - Experimental
  - Corrugated iron modelled in CAD
  - Guru (Robert Amor) assistance needed

# 1992

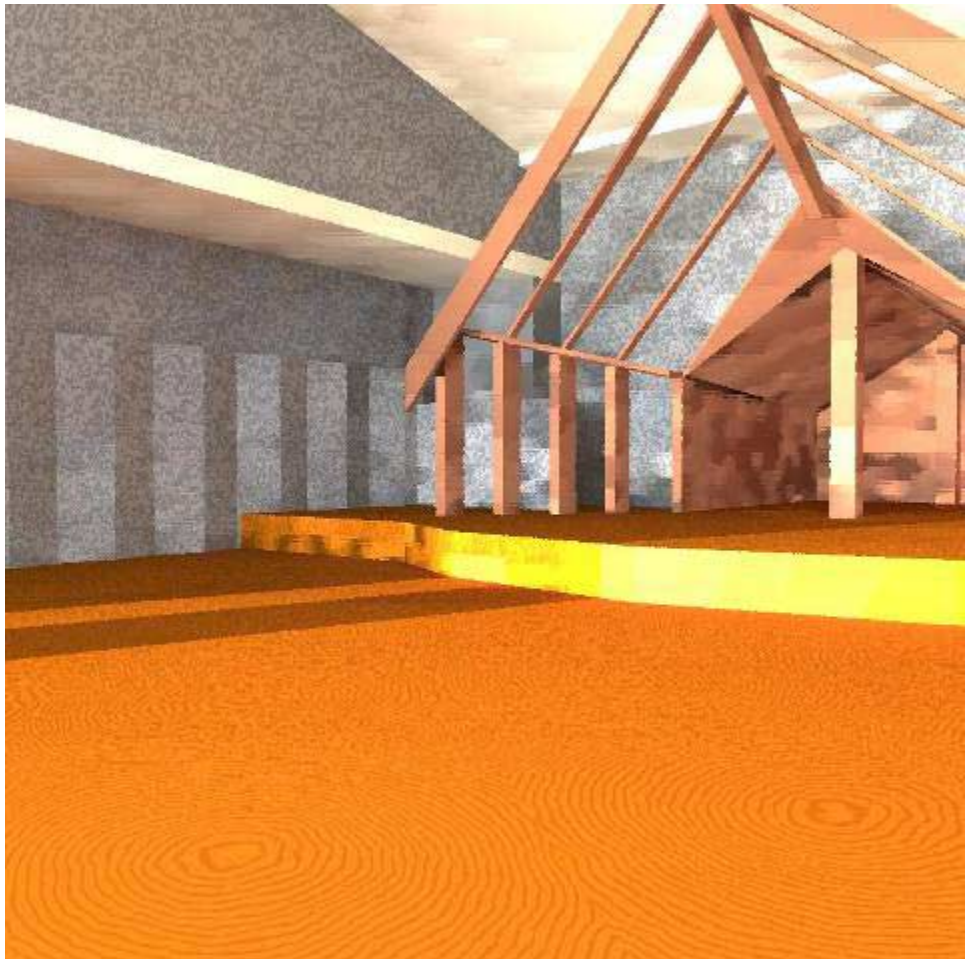
- Kath Davies
  - Guru still assisting
  - Regular class (of 3)
  - Trees and bricks are radiance properties
  - NB: Model already comprehensive



Check www.righthemisphere.com for viewer for animation in top right corner

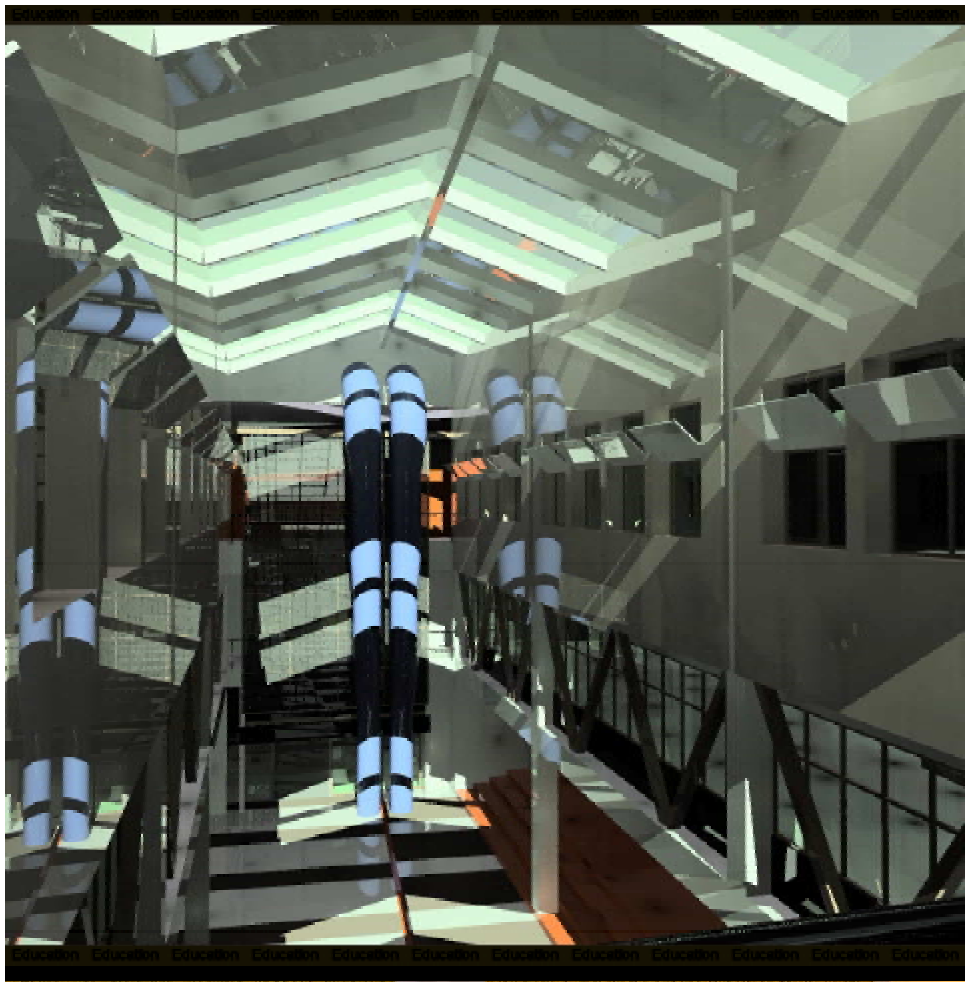
# 1993

- Museum of New Zealand / Te Papa
  - Daylight access analysis to non-daylit galleries from day and sun lit access areas
  - Students as research assistants
  - R&D: what use in practice?
  - Guru was the analyst
  - Modeller separate and simpler role
  - All the Sun Computers in the Uni over summer break
  - Conclusion: Low angle sun requires black out blinds before opening and after closing



# 1994

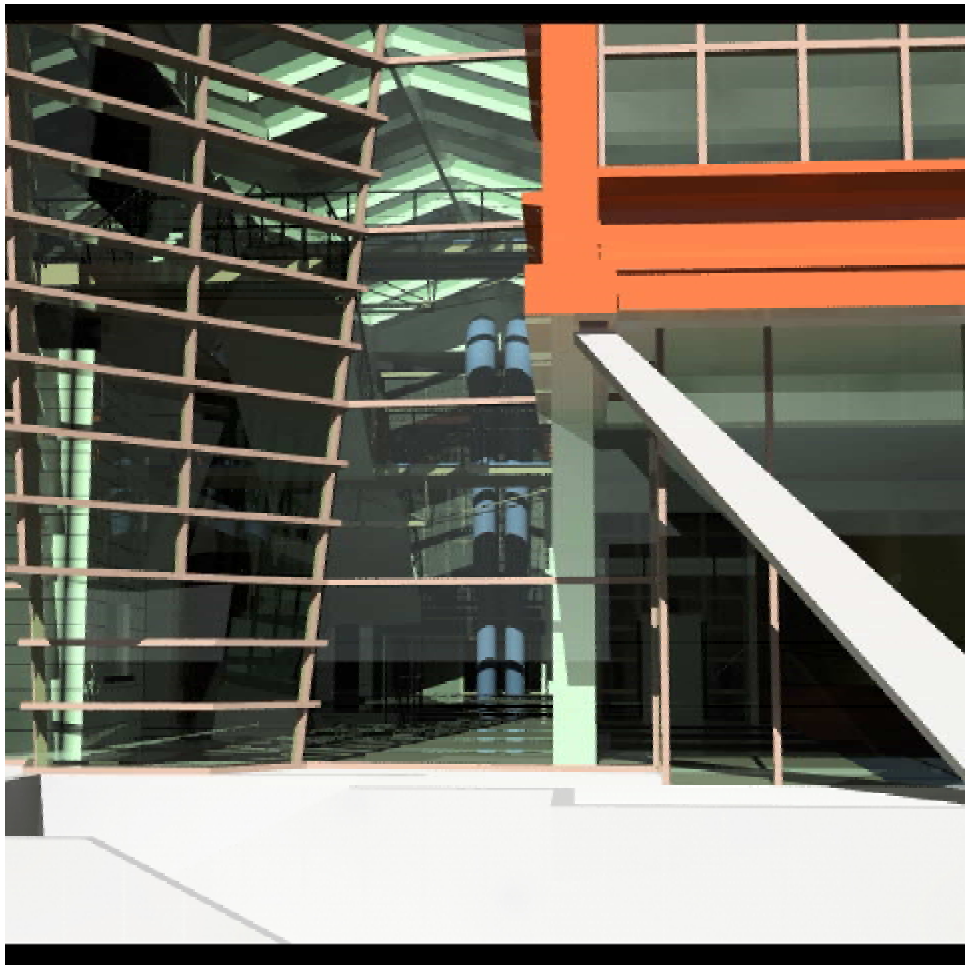
- School of Architecture & Design
  - Design options for refurbishment of old warehouse
    - Atrium added
    - Extra floor added
    - Lightshelf / reflector angles?
  - Energy analysis as well
  - Graduates doing model and analysis
  - More experimental consultancy
- Subsequent years:
  - Web – based reporting
  - 3D model imported from architects (re-modelling too expensive)
    - Hospital atrium – power game
    - University library – west shading
    - Daylight access in apartments



# SOAD – pre/post

Reality

3D Studio render

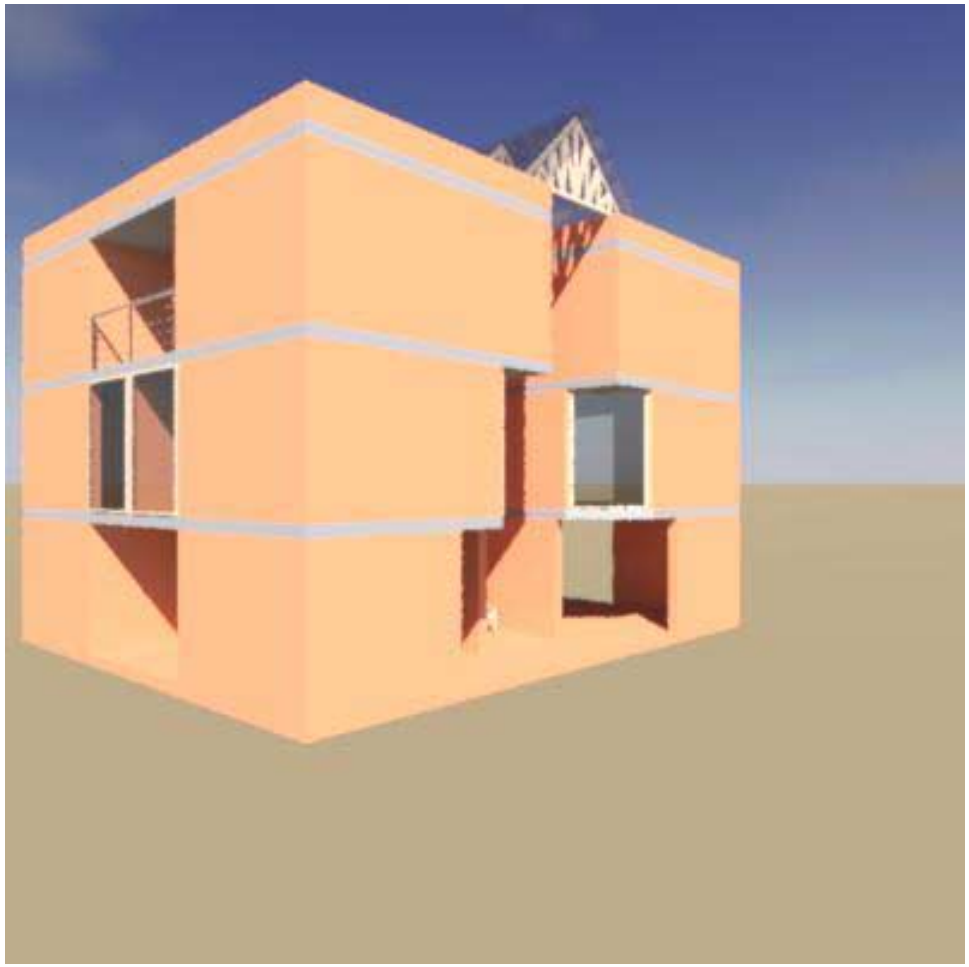


Radiance

# 1995-1998 –translator /interface search

- Internet / emaildiscussions about translator(s)
  - DXF:
    - TORAD – faithful tool in early years
    - DDRAD – worked on trying to compile this ourselves - failed
  - CAD Integrated
    - Archicad -> Paul Bourke's xlator did not work with our version
    - Microstation -> ETH Zuerich + Bentley ¾ completed
    - MIT -> cannot remember what happened to this trail
    - Desktop Radiance – out of date once we got it installed (incompatible with our version of AutoCAD)
  - Interfaces
    - ADELINE – DXF based, theoretically generic – never got the hang of it
    - Conrad v 1 and 2 – 3ds based
      - lowest common denominator triangles
      - Smoothing and material uvw mapping available
      - Disappeared b4 we got past its bugs
    - Rayfront - DXF based, theoretically generic – what we went with – easiest to use by far
    - Ecotect – DXF/3ds based –
      - We are recent users, considering change because of 3ds interface
      - limited control
      - Interface gets in way of rendering at present
    - Light Studio – Radiance as render 'engine' – current favourite as fits with all else students do
      - Translation problems have 'disappeared'
      - imports DXF, DWG, 3ds
      - Placement of cameras, application of materials intuitive
      - Preview live (though rview not incorporated)
  - Uncle Tom Cobbley
    - These are only the ones we have tried
    - FRUSTRATION: no standard file structure (e.g. materials libraries – so inter-translation of radiance files from one program to next is something I have to do each time with the students – it is not intuitive

Classic illustration of translation problem: ArchiCAD v7 DXF OK; v8/9 Not OK. (First picture) Solution? Export to 3ds format. Then convert to DXF via AutoCAd / Deep Explorer from www.righthemisphere.com (Second Picture)



# 1995/6 How close is close enough?

- Dave Jarvis
  - Really good model of a computer
    - for glare illustration
  - Really well made physical model; cf real measurements; cf radiance model
  - Comparison of prediction quality vs time taken / quality

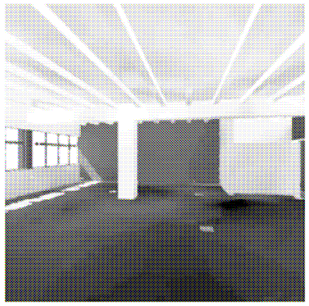


**Figure 14** Internal Radiance Rendering - Low Quality

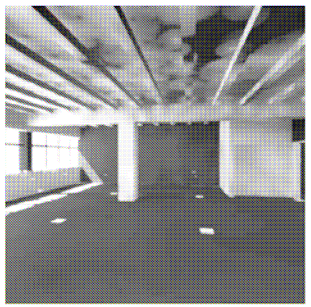


**Figure 15** Internal Radiance Rendering - Medium Quality

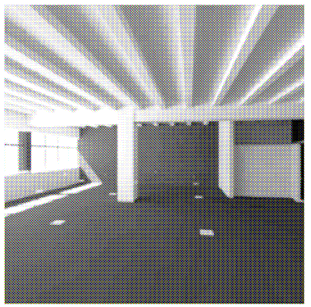


**Figure 16** Internal Radiance Rendering - High Quality & Medium Variability

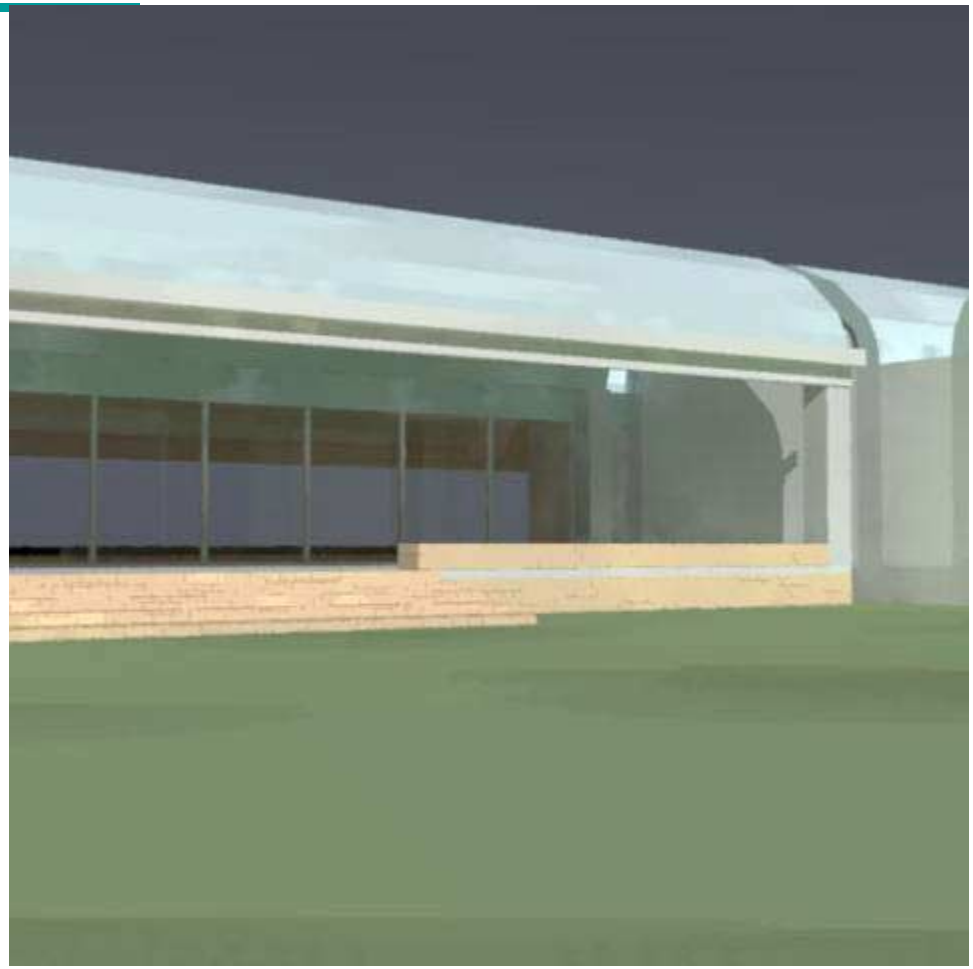
**Figure 2** Internal Photograph of Physical Model

# Custom Tutorials - essential

- Toolkit developed 2000
  - In 2005 it is used by all building science, and some architecture, by end of year 2
  - Focuses on rayfront as user interface
- Translation is becoming easier
- From late 90's
  - Elective CAD Course Radiance has been a staple
  - intro tutorials require all students to do 3 models in 3 CAD programs
  - render each model twice
    - Initially once lightscape once radiance
    - Then once 3DS Viz radiosity once radiance

# 1998

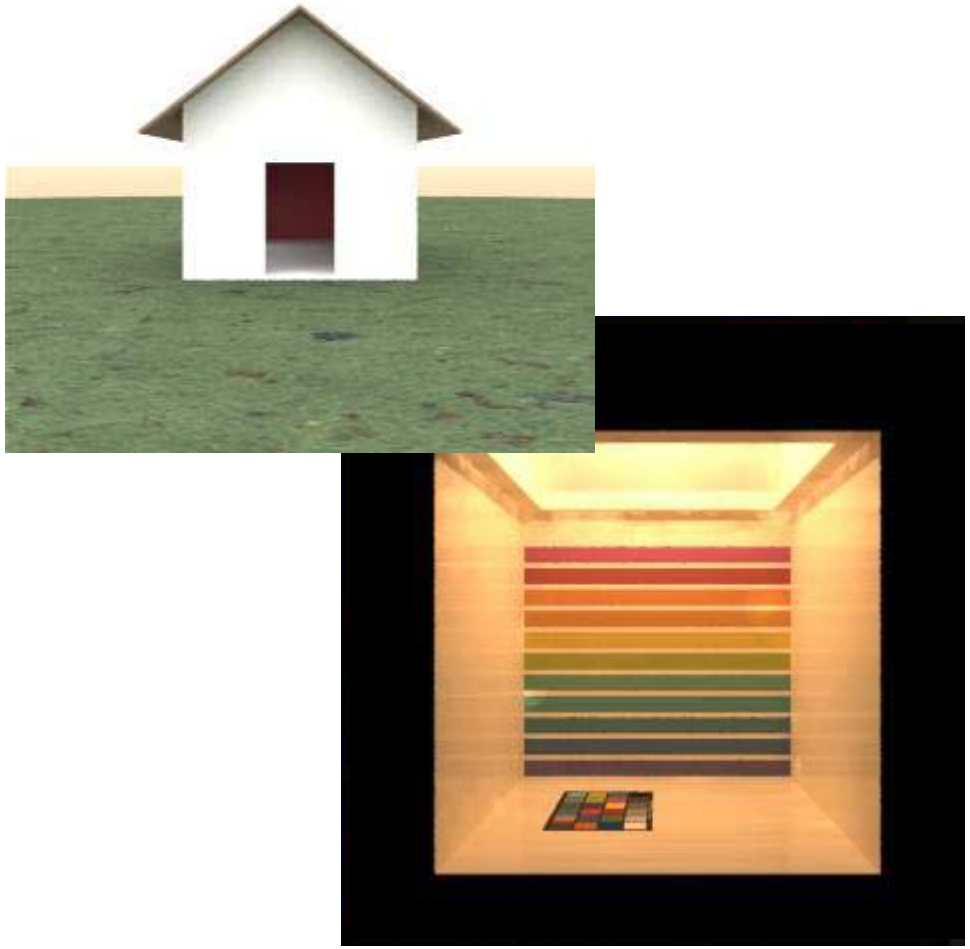
- Kimbell – Kahn – Emma Alcock and Amy Anderson
- Sarjeant Gallery – Dan Jurgens
- Ustation + AutoCAD



Where students have used Frames in their web pages, so external links are a problem – navigate to “Final Renders” or “Assignment 1” then to “Renders”.

# 1999

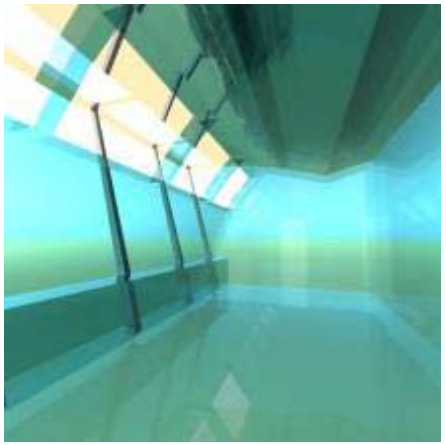
- Sam Curtis
  - Lighting quality assessment: simulation vs reality
- Steven Lee & Russell Maunder
  - Daylight Simulation vs reality
    - Physical model
    - Lightscape
    - Radiance
  - Lamp colour rendering
    - Reality
    - Lightscape
    - Radiance

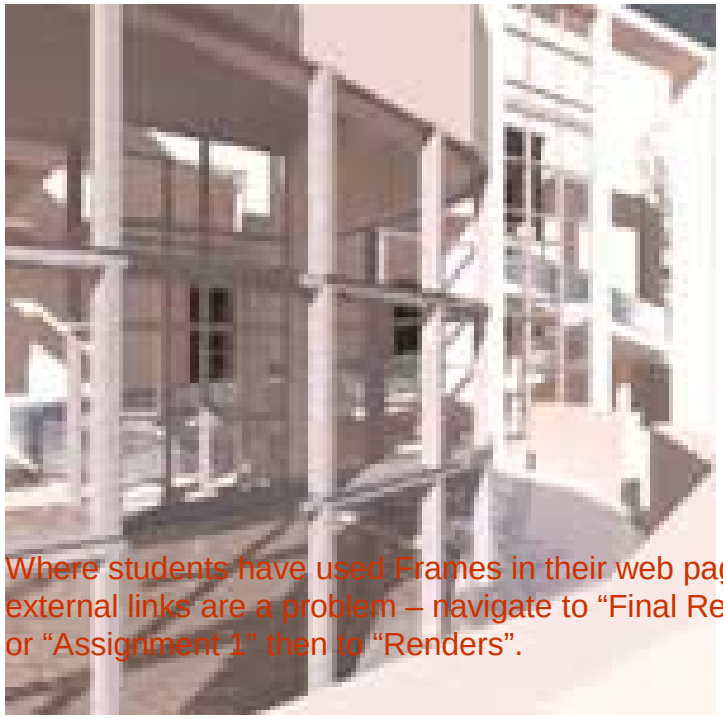


# 2000

- Libeskind – Jewish Museum – Raffe Smith
- Meier – Kunsthandwerk Museum – Regan Johnston

•More complex geometry in ArchiCAD tutorial





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# 2001

- Quentin Jackson
  - Quality vs time
    - Lightscape
    - Radiance
- Eisenmann - Wexner Centre Stuart Hay &
- Meier - High Museum Erin Collins &

•Even more complex geometry in AutoCAD tutorial

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# 2002

- Calatrava – Milwaukee – Patrick Arnold & Luke Smeaton & Jason Berben
- Libeskind –V&A Spiral – Melissa Green & Lauren Wong
- Holl - Bellevue - Vicki Leibowitz & Ana O'Connell
- Miro – Barcelona - Irena Pratley
  - *Returning to Radiance materials after 8 years!*
- AutoCAD, ArchiCAD, Revit (latter for the first time)

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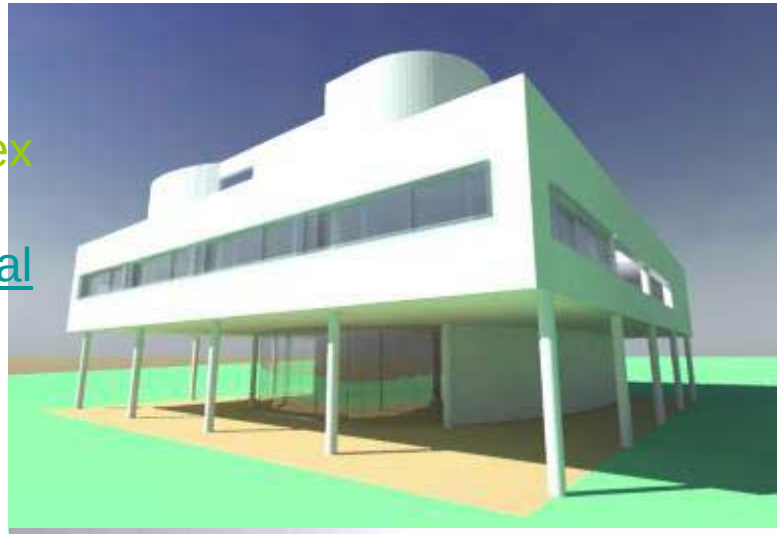
# 2003

- Buchan – Christchurch Art Gallery – Mark Jolly
- Libeskind - Denver - Charlotte Goguel
- Calatrava – Museum of Science – David Sherbourne
- Meier – High Museum of Art – Tara Warbrick
- Moneo – Pilar & Joan Miro Foundation – Ruth McKenzie

•More complex geometry in Revit tutorial



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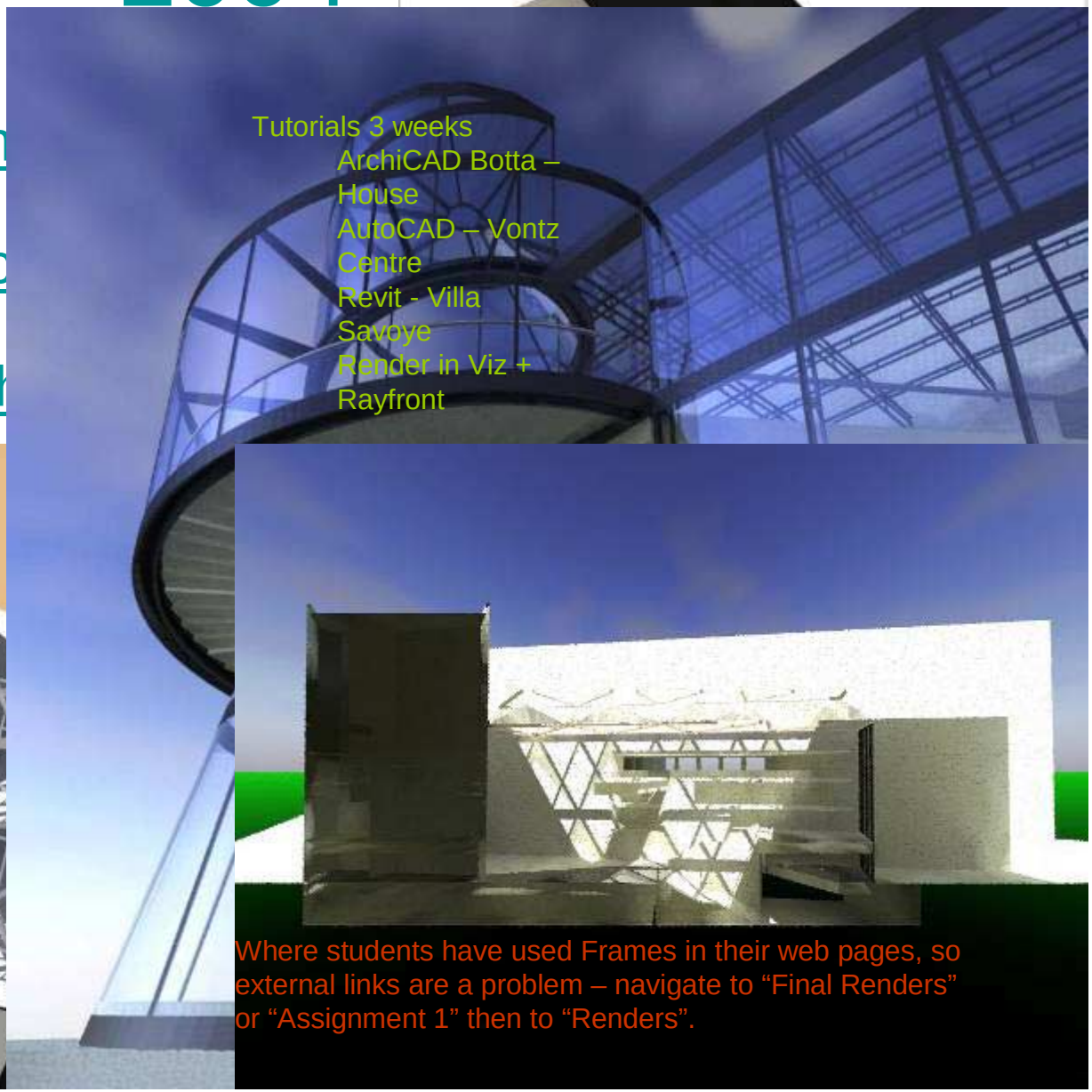
# 2004

- Buchan – Christch
  Stuart Ashdown
- Hadid – Connectic
  Xu
- Libeskind – Jewish
  Museum – Russel
- Meier – Ge
  Hall
- Venturi & S
  National G
  Yates
- Pei – West
  Simon Hall



Tutorials 3 weeks
- ArchiCAD Botta – House
- AutoCAD – Vontz Centre
- Revit - Villa Savoye
- Render in Viz + Rayfront



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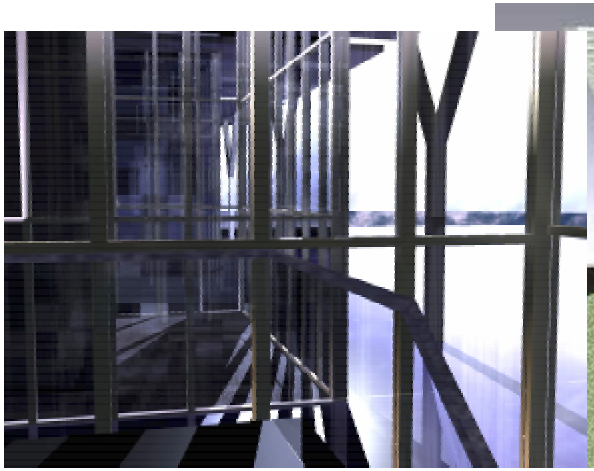
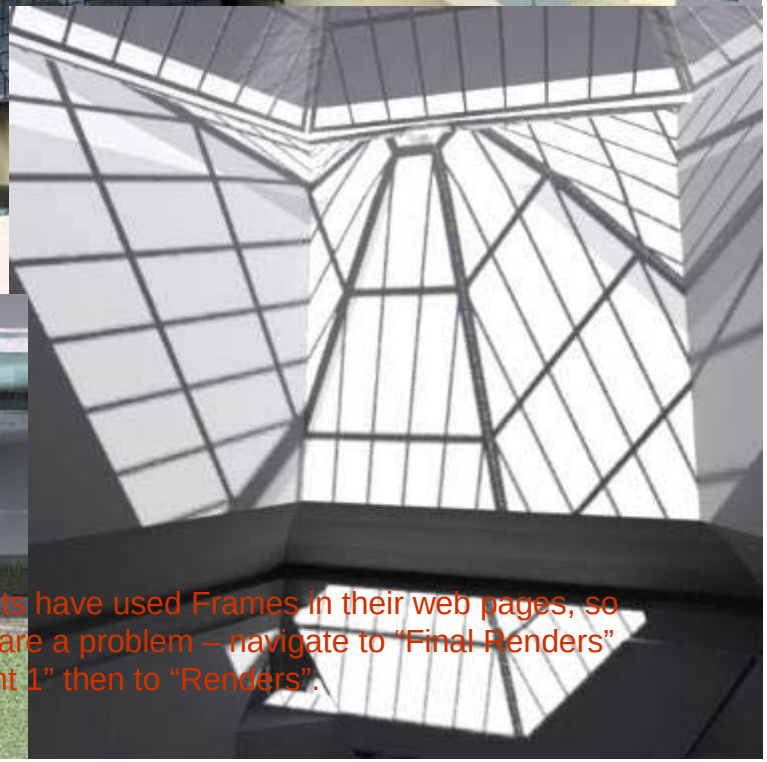
# 2005

- Coop Himmelb(l)au – UFA Cinema Centre - David Chisholm
- Freed - Holocaust Museum – Niki Forrest
- Piano – Beyeler Foundation – Blair Parkinson
- Ando – Fort Worth Museum of Modern Art – Anna Synge



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# Radiance / Rayfront Now?

- Effort worthwhile: YES
  - Staple of second year lighting intro
  - Staple of 3rd year lighting elective
  - Core part of the business for many local consultants (IES or Rayfront interface)
- Still concerned:
  - to get materials working intuitively
  - Concerned that material definitions are non-standard
  - to get students seeing render times of > 5 minutes as no big deal!
- Interested in new interfaces:
  - Light Studio
    - animation potential
    - Smoothing!
    - Integration with CATT Acoustic
    - 3ds file format rocks!
    - Gendaylit?
    - DDS/Daysim?
  - Ecotect
    - (after this morning! – existing is frustrating
    - Students already use Ecotect (Tutorial written!)
    - But: gendaylit
    - DDS/Daysim?
- Want to know:
  - how to do interactive animations with light rendered?
  - Work around to do real skies in Windows O/S NOW
- This journey has been in retrospect about finding a translator students trust

With Right Hemisphere viewer loaded: try right click and select <views><Camera 2> to see animation; at any time left click to view model from viewpoint you want; right click and select <Display> to view transparent / illustration mode etc; also right click <Display><info bar> to see list of objects that can be switched on / off; and finally press F11 to view all this full screen

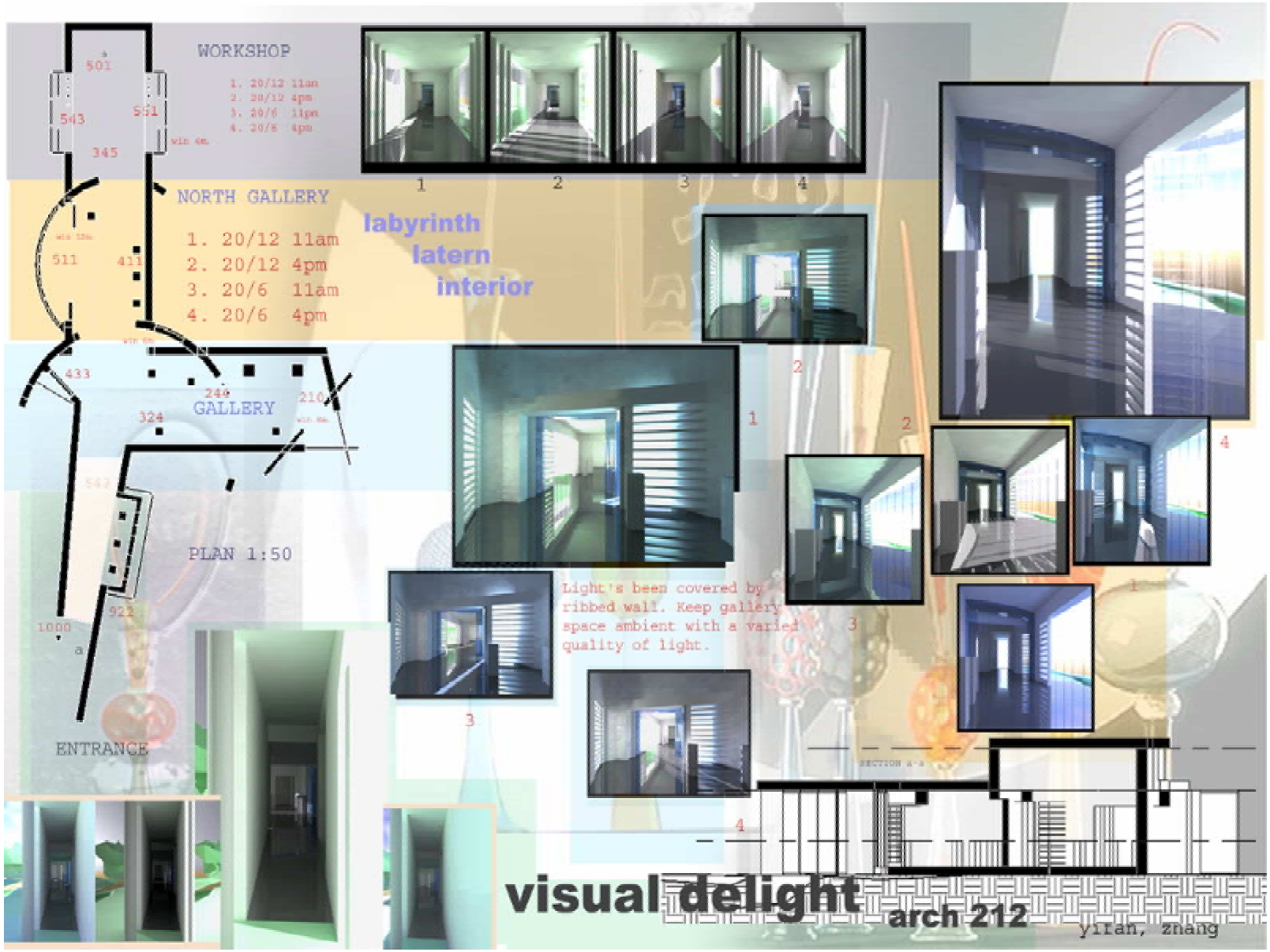
Check www.righthemisphere.com for viewer for animation top right

Yifan Zhang

# Fully Digital Core Arch. Studio – Yr 2 — including Rayfront/Radiance

**Visual DELIGHT**

**Project**




..to celebrate the use of light in architecture while controlling it in your design. .. to interweave the ceremonial and the functional aspects of the use of natural light so as to enhance the experience of architecture.

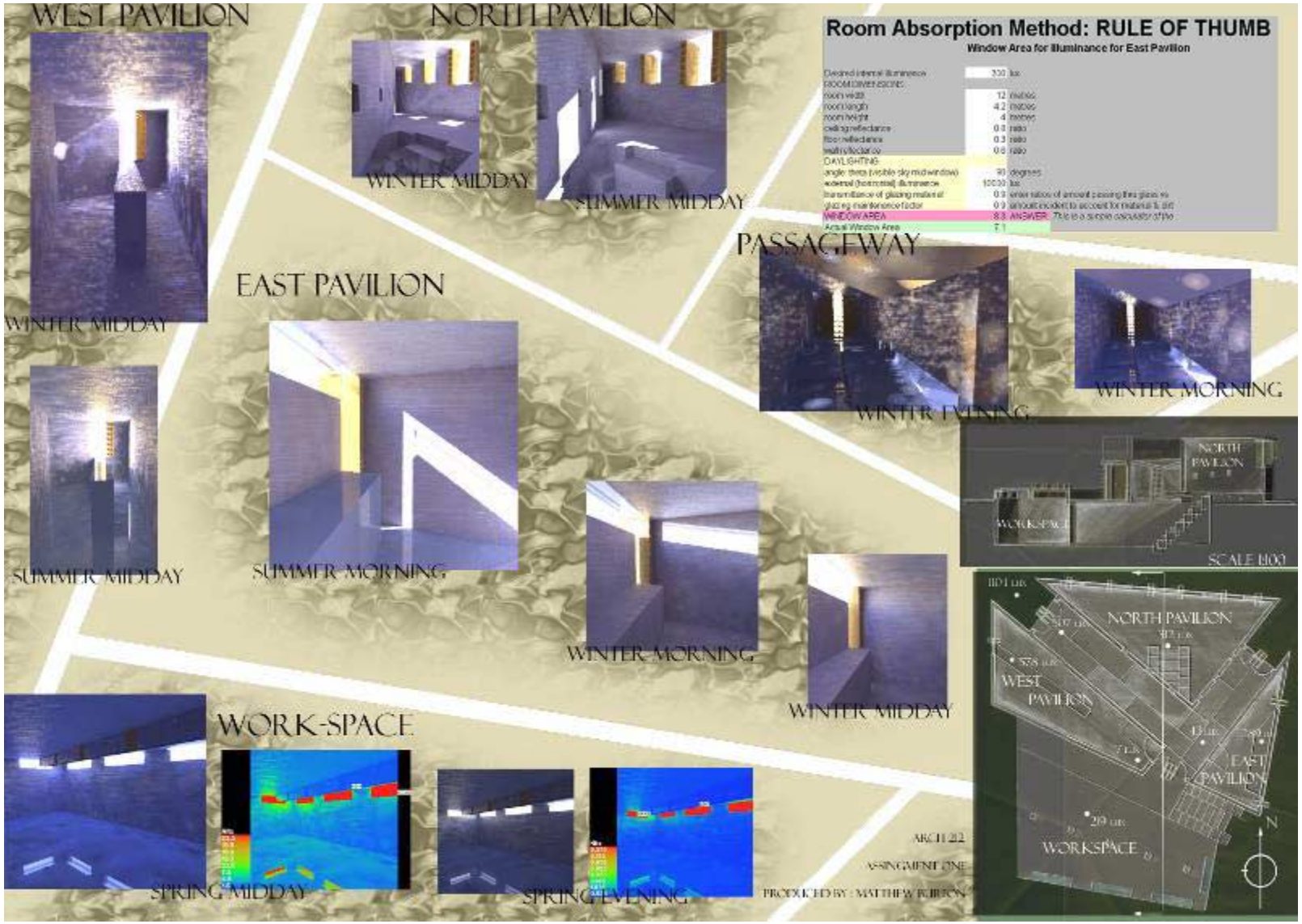
Back to conclusions

Matthew Burton

# Fully Digital Core Arch. Studio – Yr 2 — including Rayfront/Radiance

**Visual DELIGHT**

**Project**

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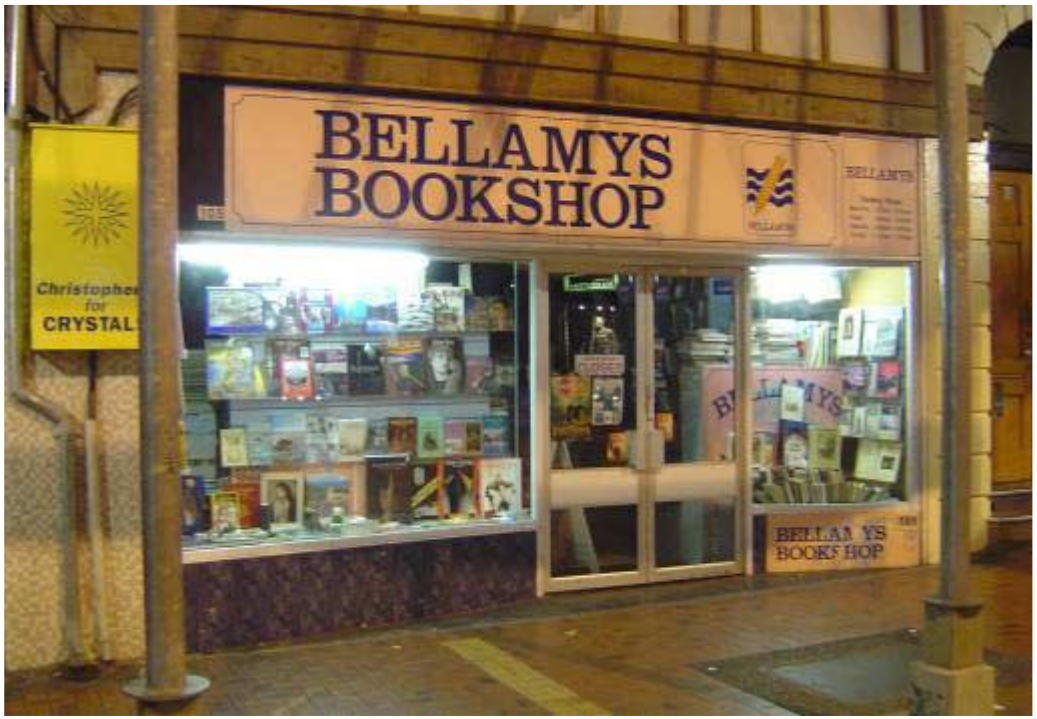
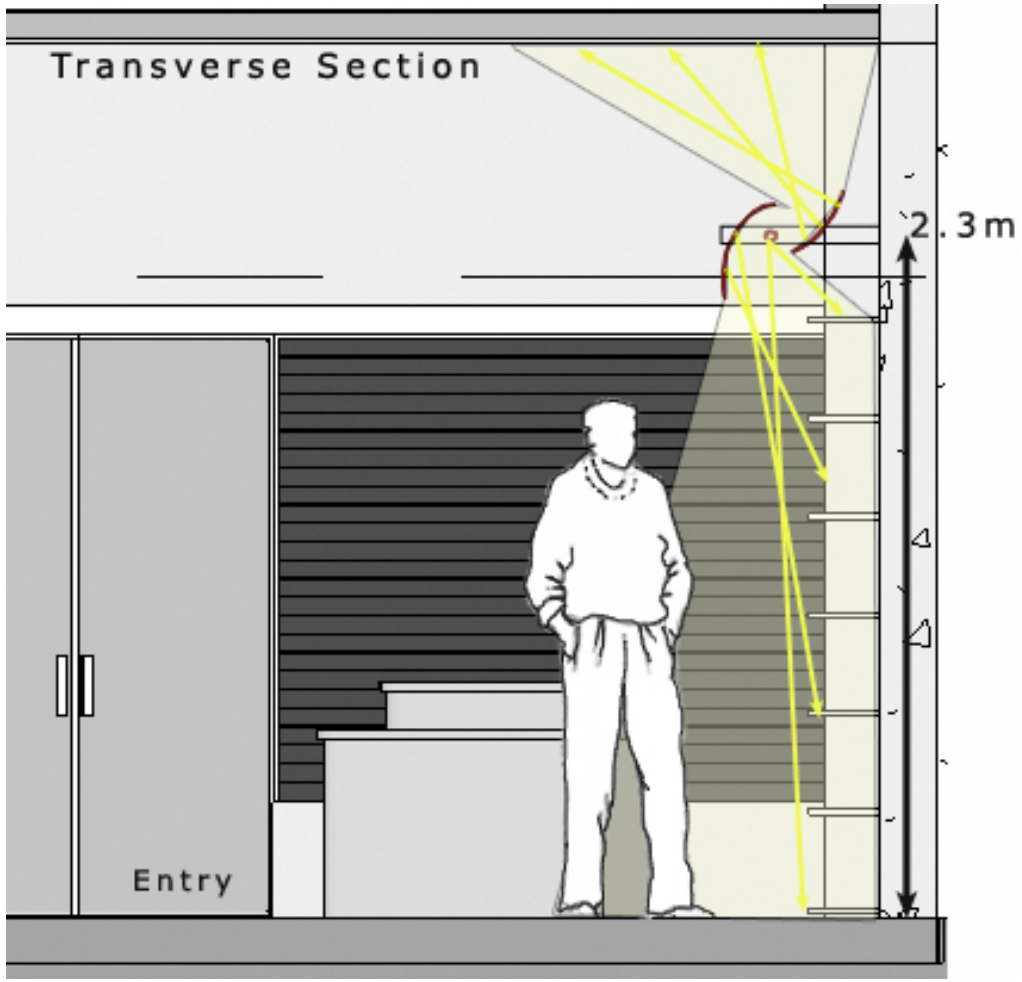
Yr 3 / 4 Lighting Elective - 2005




Assess Shop lighting
Design luminaire
Measure photometric performance
Create IES file
Insert IES file into Scene

Back to conclusions

Yr 3 / 4 Lighting Elective - 2005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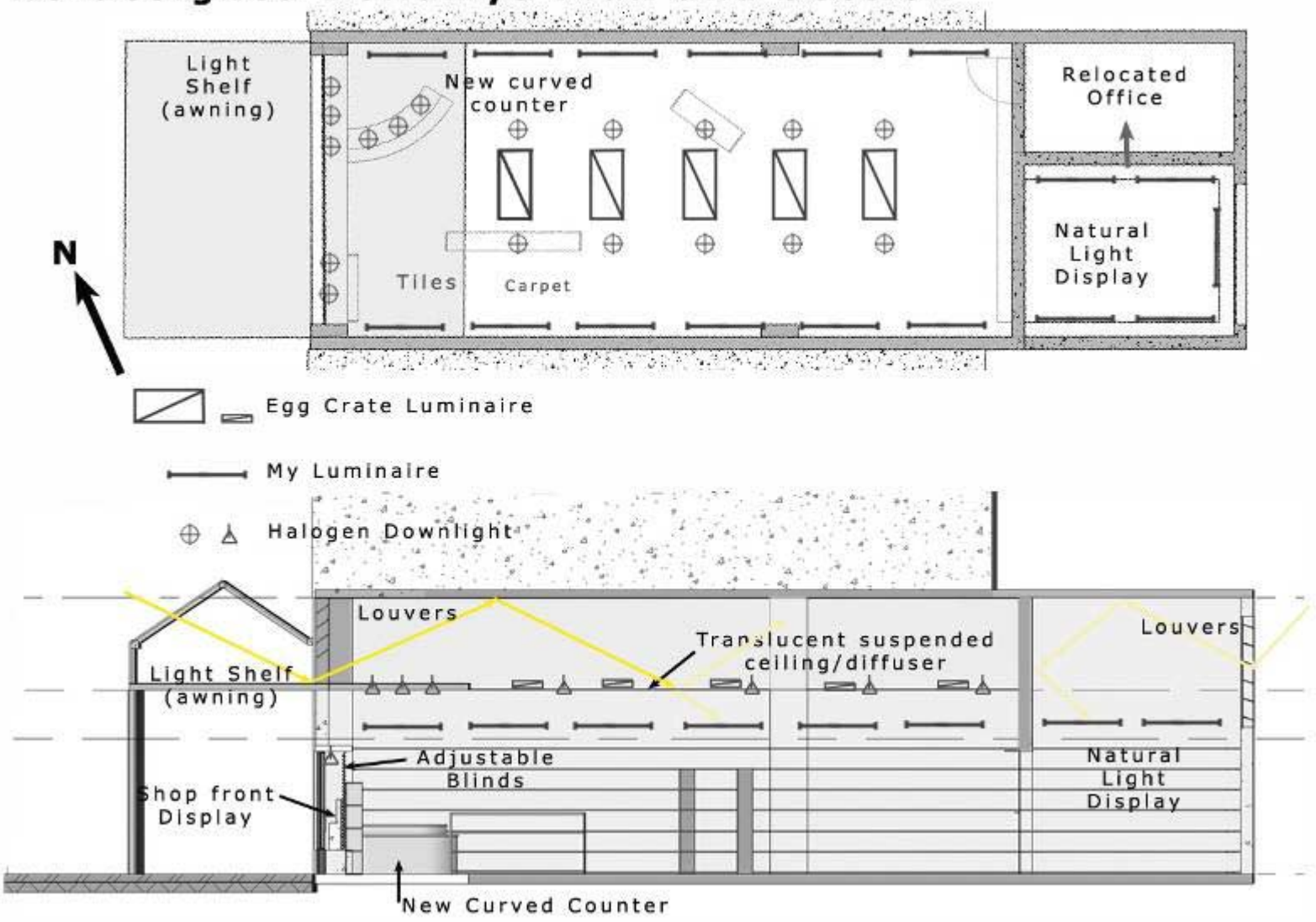
Yr 3 / 4 Lighting Elective - 2005

## Re-designed Bellamys Plan and Section

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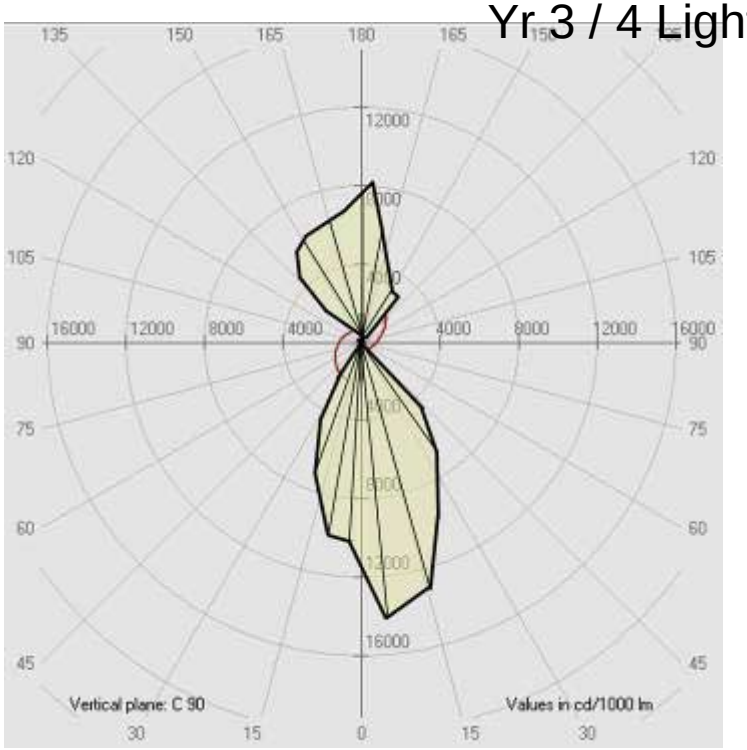


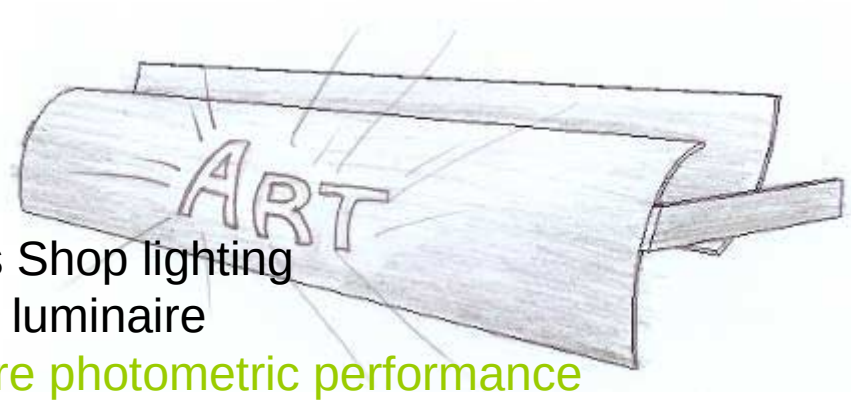


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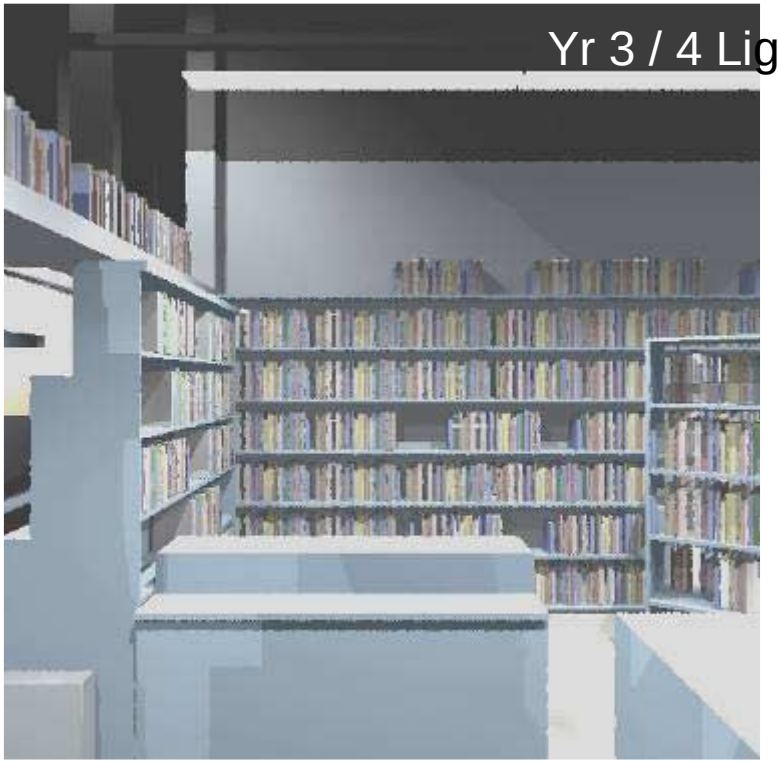

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Light Studio – example file from web site


Back to conclusions