

**Landscape Architecture Program**  
**College of Architecture and Planning**  
 Campus Box 126 PO Box 173364  
 Denver, CO 80217-3364  
**University of Colorado at Denver**

LA 6686, ARCH 6390

This class is an intensive January seminar.

Classes will take place between 1/5 – 1/16 2009, MWF 8:30 am – 4:30 pm

Instructor: Leila Tolderlund.

Office hours: 512 – by appointment.

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## green roofs, vertical gardens and other living systems

*design and implementation*



*"Our world is changing. The paradigm is shifting. Ancient rituals and new thoughts are converging. We have become a community of seekers with a wider worldview and our purpose will be to tell stories that capture both the magical and practical ways of the worlds."*

*R&Sie kontent<real*

### **INTRODUCTION**

In recent years studies have shown that green roofs perform extremely important functions in urban areas. Living systems such as green roofs and vertical gardens provide many ecological, aesthetic, and financial benefits, including:

- controlling stormwater runoff, erosion, and pollution
- improving water and air quality
- mitigating urban heat-island effects, cooling and cleaning the air
- more than doubling the service life of roofs
- conserving energy
- reducing sound reflection and transmission
- creating wildlife habitat
- improving the aesthetic environment in both work and home settings

This seminar will engage in cross disciplinary discussions, critiques and envision settings for current and future green roof systems, vertical gardens and other living systems. We will focus on environmental and ecological issues, poetic and symbolic performances and experiential and ethereal manifestations. These findings will be translated into new symbiotic relationships using this synthesis between landscape and architecture to facilitate a deeper understanding of the role living systems play as an integral and functional building element that protects watersheds, while increasing biodiversity and quality of life in urban areas.



R&amp;Sie, Croissance growing, 1993.

William McDonough, China Vision, 2006

R&amp;Sie, Sedimentation, 1993.

*"Our idea was that if a bird flew over the building, it would not know that anything had changed."*

*William McDonough*

### SEMINAR OBJECTIVE

This seminar has two main objectives:

1. To give students a general understanding of living systems such as: green roof systems, vegetated roofs above underground architecture and vertical vegetated gardens.
2. To envision how living systems can be incorporated into urban planning by engaging in critiques and discussions using readings, movies and international, national and local case studies.

This seminar will cover:

- + BRIEF HISTORY OF GREEN ROOFS
- + MAJOR TYPES OF GREEN ROOFS, VERTICAL VEGETATED SYSTEMS AND OTHER LIVING SYSTEMS
- + OVERVIEW OF ESSENTIAL AND OPTIONAL GREEN ROOF/GREENWALL FUNCTIONS & COMPONENTS (INTENSIVE/EXTENSIVE)
- + 'SELLING THE CONCEPT' - PUBLIC AND PRIVATE BENEFITS
- + MAJOR ENVIRONMENTAL AND INFRASTRUCTURAL DESIGN ASPECTS THAT HAVE AN INFLUENCE ON THE BENEFITS OF GREEN ROOFS.
- + HOW TO CALCULATE GREEN ROOF COSTS - INTRODUCTION.
- + GREEN ROOF/GREEN WALL DESIGN PRINCIPLES - INTRODUCTION.
- + OPPORTUNITIES & CONSTRAINTS FOR INTERNATIONAL/NATIONAL AND COLORADO CONDITIONS.



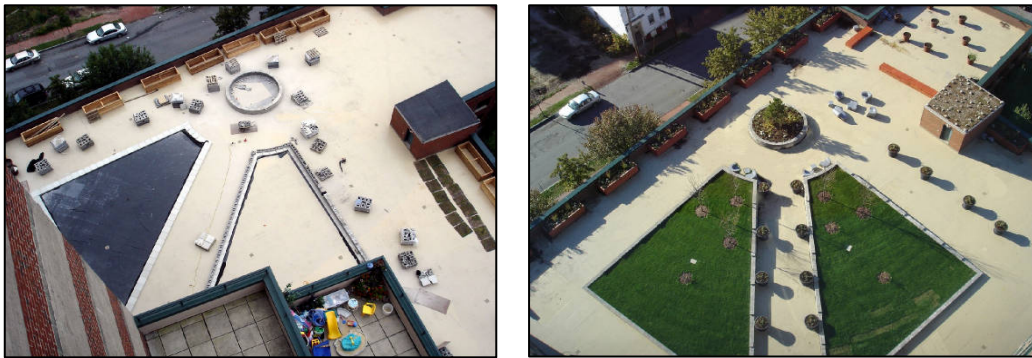
### SEMINAR SEQUENCE

This seminar is a venue for exploration and innovation that requires the active participation and engagement of all class members. This endeavor is a team effort and students will be asked to contribute according to individual skills and areas of interest.

The seminar in general – but especially during the first part – is a combination of short lectures, group discussions, brainstorm meetings, site visits, individual research, assignments and pin-ups.

Second part of this seminar is grounded in identification and assessment of opportunities and constraints surrounding specific design problem(s) related to living systems integrated into urban settings. Students will situate proposed design(s) within a larger cultural, social and ecological

context and then frame, structure and set up strategies for a final conceptual green roof/vegetated vertical garden/living system design(s).



### **GENERAL OUTCOMES:**

**PROFESSIONAL ETHICS:** The ability to critically evaluate local and global social issues, diverse cultures, economic structures, and ecological systems as guiding principles for living systems design.

**DESIGN:** The ability to:

- Formulate questions and arguments about green roofs, vegetated vertical gardens and living systems and its role as a cultural medium within landscape architecture, architecture and urban planning.
- Determine processes and practices that lead to conceptual/ formative actions that transform existing situations into preferred alternatives using living systems in constant flux.

**COMMUNICATION AND REPRESENTATION:** The ability to speak, write, create and employ appropriate representational media to effectively convey ideas.

**CONTENT KNOWLEDGE:** The ability to develop a critical understanding and apply the histories, theories and practices of living systems (such as green roofs and vegetated vertical gardens) and its role in reflecting and shaping culture, phenomena, poetics, ecology and environment.

### **MY RESPONSIBILITIES:**

- To come prepared to engage in the work of the class.
- To offer readings, websites and course materials and create a solid base for research, investigation and group discussions.
- To set up site visits.
- To meet and evaluate group and individual work.
- To facilitate group discussions and work within the groups.
- To develop and maintain a dynamic learning environment.

### **YOUR RESPONSIBILITIES:**

- To come prepared to engage in the work of the class.
- To read the course materials.
- To finish assignments in a timely manner and be prepared to talk about your work in class.
- To participate in class discussions and respect the ideas of others.
- To engage in and complete group tasks in a timely manner.
- To prepare and present final conceptual designs.

- To understand and abide by the academic policies of the university and the scholarly community.



Green Roof, Austria.



Chicago City Hall, Chicago, Illinois



Green roof experiential model.

### PROJECTS AND ASSIGNMENTS:

This seminar requires daily preparation of readings, research, assignments and design development. You will be expected to participate in group discussions, to present your individual work and to participate in group presentations.

### GRADING AND EVALUATION:

Attendance is mandatory and 100% collaboration with team members and classmates are essential to your success in this seminar.

Engagement, innovation, quantification and final presentation of research, planning and design will all be included in the way you are evaluated. Presence, passion, participation and persistence are strongly encouraged in this seminar.

Missed classes will result in lower grade. Research and production work beyond class hours and demonstration of progress in each class, will be expected.

Students will be assigned a letter grade at term end. Students will be evaluated based on their enthusiasm and commitment to investigating and advancing the process along with the quality of work, work ethic, verbal and graphic presentations and collaborative efforts.

You will in general be evaluated based on the following:

|   |     |
|---|-----|
| Class Participation and Engagement in discussions | 30% |
| Clarity and Depth of Research:                    | 20% |
| Resolution and Development of Strategy:           | 30% |
| Oral and graphic presentation and articulation:   | 20% |

(All work will be submitted to the course folder throughout the semester *and* on CDs/DVD's at term end.)

### REQUIRED READINGS: Books:

Dunnett, Nigel and Kingsbury, Noel. 2004. Planting Green Roofs and Living Walls. Timber Press, Inc. ISBN 0-8819-2-640-X

**RECOMMENDED READINGS:****Books:**

Snodgrass, Edmund C. and Snodgrass, Lucie L. 2006. Green Roof Plants. Timber Press, Inc. ISBN 0881927872

Margolis, Liat and Robinson, Alexander. 2007. Living Systems. Birkhauser Verlag AG. ISBN 978-3-7643-7700-7

Earth Pledge. 2005. Green Roofs - Ecological Design and Construction. Shiffer Books. ISBN 0-7643-2189-7

**Websites:**

[www.greenroofs.net](http://www.greenroofs.net),  
[www.greenroofs.com](http://www.greenroofs.com),  
[www.roofscapes.com](http://www.roofscapes.com),  
[www.greengridroofs.com](http://www.greengridroofs.com)  
[www.g-sky.com](http://www.g-sky.com)  
[www.hydrotechusa.com](http://www.hydrotechusa.com)  
[www.verticalgardenpatrickblanc.com](http://www.verticalgardenpatrickblanc.com)



(Additional required readings/articles and conference papers used for discussion will be shared throughout the seminar)

**CALENDAR - Important dates:**

**This class will meet 1/5 – 1/16 2009**  
**MWF 8:30 am – 4:30 pm:**

|                 |  |
|-----------------|--|
| <b>01.05.09</b> | Introduction to class                            |
| <b>01.07.09</b> | class  |
| <b>01.09.09</b> | class  |
| <b>01.12.09</b> | class  |
| <b>01.14.09</b> | class  |
| <b>01.16.09</b> | <b>Final project due</b><br>(analog and digital) |



HERZOG & DE MEURON, Prada Aoyama Epicenter In Tokyo