Analog-Digital
Light Box Exercise

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"...we have presented a studio course, or if you prefer, a laboratory or workshop course which opposes an administrative attitude of 'theory and practice.' Naturally practice is not preceded but followed by theory. Such study promotes a more lasting teaching and learning through experience. Its aim is development of creativeness realized in discovery and invention–the criteria of creativity, or flexibility, being imagination and fantasy. Altogether it promotes 'thinking in situations,' ... it is time to advocate again a basic step-by-step learning which promotes recognition of insight coming from experience, and evaluation resulting from comparison. This, in sum, means recognition of development and improvement, that is, of growth, growth of ability. This growth is not only a most exciting experience; it is inspiring and thus the strongest incentive for intensified action, for continued investigation (search instead of re-search), for learning through conscious practice."

- Josef Albers. *from Interaction of Color*

Today's architecture student must fluidly demonstrate design interchangeably with both physical material and new media. The Analog-Digital Light Box exercise sets up a rigorous series of incremental and additive exercises, but at the same time introduces an attitude of open experimentation. The course is not a disconnected technical computer training course, but a seamless exchange of information between various design applications, creating an inviting environment in the context of contemporary media. The exercise stimulates action followed by reflection, or as Albers suggests, a non-administrative approach to practice followed by theory.

(3) new media objects are modular parts that can be rearranged; (4) variability means that the parts may be used or displayed in a variety of ways; (5) and transcoding allows the objects to be transformed and manipulated, creating entirely new kinds of products. All of these points are demonstrated in the course.

This method has many potential beginnings. It can start with drawing, photography, or physical modeling, with or without specific formats or procedures. The starting points are varied over the years so that it does not become a static or predictable formula. The seeming mystery of the overall ap-
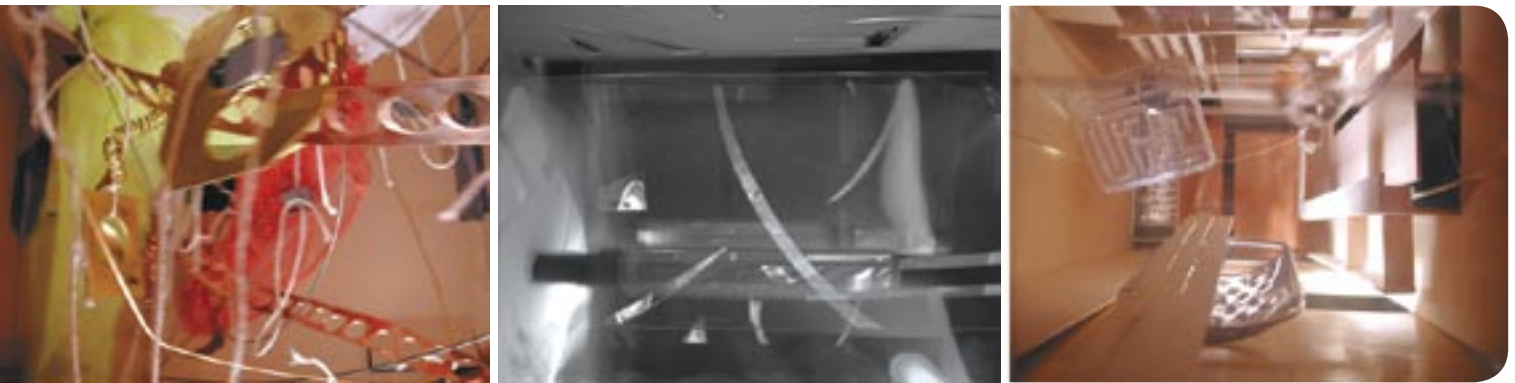

Fig. 01. Analog light boxes: KEVIN MERKLING, JEFF OLGIN, ERIC MITCHELL.

The Analog-Digital Light Box relies on timeless ideas drawn from Lazlo Moholy-Nagy's book, *Vision in Motion*, where he discusses camera-less photography, space modulators, motion cubes, light boxes, and the eight varieties of photographic vision (abstract, exact, rapid, slow, intensified, penetrative, simultaneous, and distorted seeing). The design methodology emphasizes experiential and sensorial perception enabling the study of form, space, material, light, shadow, color, transparency, translucency, texture, and motion.

Traditional media is combined with new media. Current trends are referenced from *The Language of New Media* by Lev Manovich where he proposes a five-point definition of New Media: (1) new media objects can be numerically represented; (2) digitized objects can be dynamically automated;

proach is a part of the game of discovery. As the technologies of new media evolve, other trajectories and combinations are possible. As each new group of students engages the exercises, new ideas are applied to the pedagogy for future groups. Thus, the exercise is an evolving dynamic process.

The Analog-Digital Light Box returns to the basics by requiring tactile studies in different media. After a physical media is introduced, then a tactile digital one is worthy of study, followed by physical form studies. The ability to fluidly move ideas through control, experimentation, and interaction is a key milestone. While students must be brought through a range of media very quickly, the goal is unchanged: teach them to appreciate the nature of each medium they approach, so they can apply that appreciation in future design.

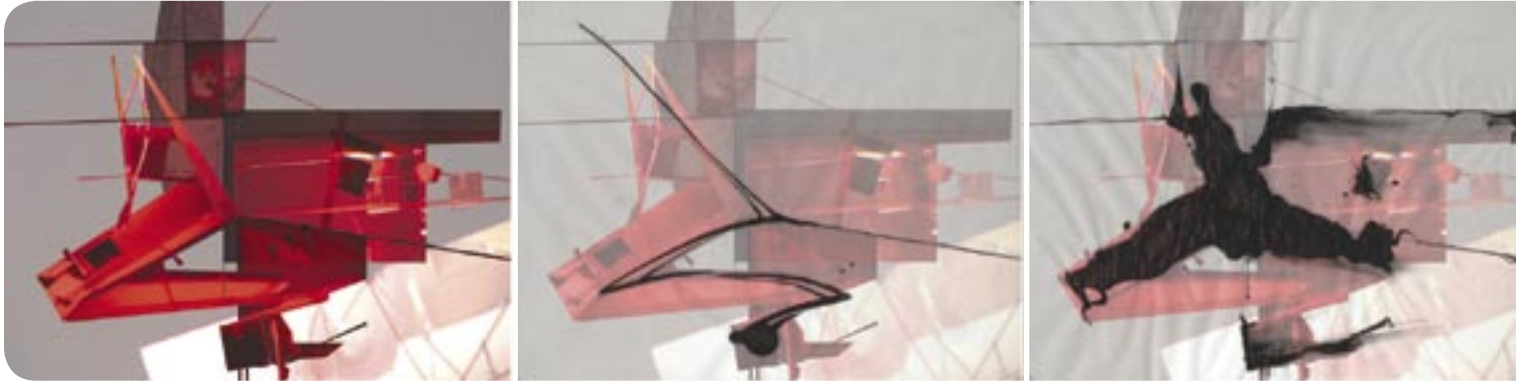Fig. 02. Analog light box digital performances: C.J. MACQUARRIE.

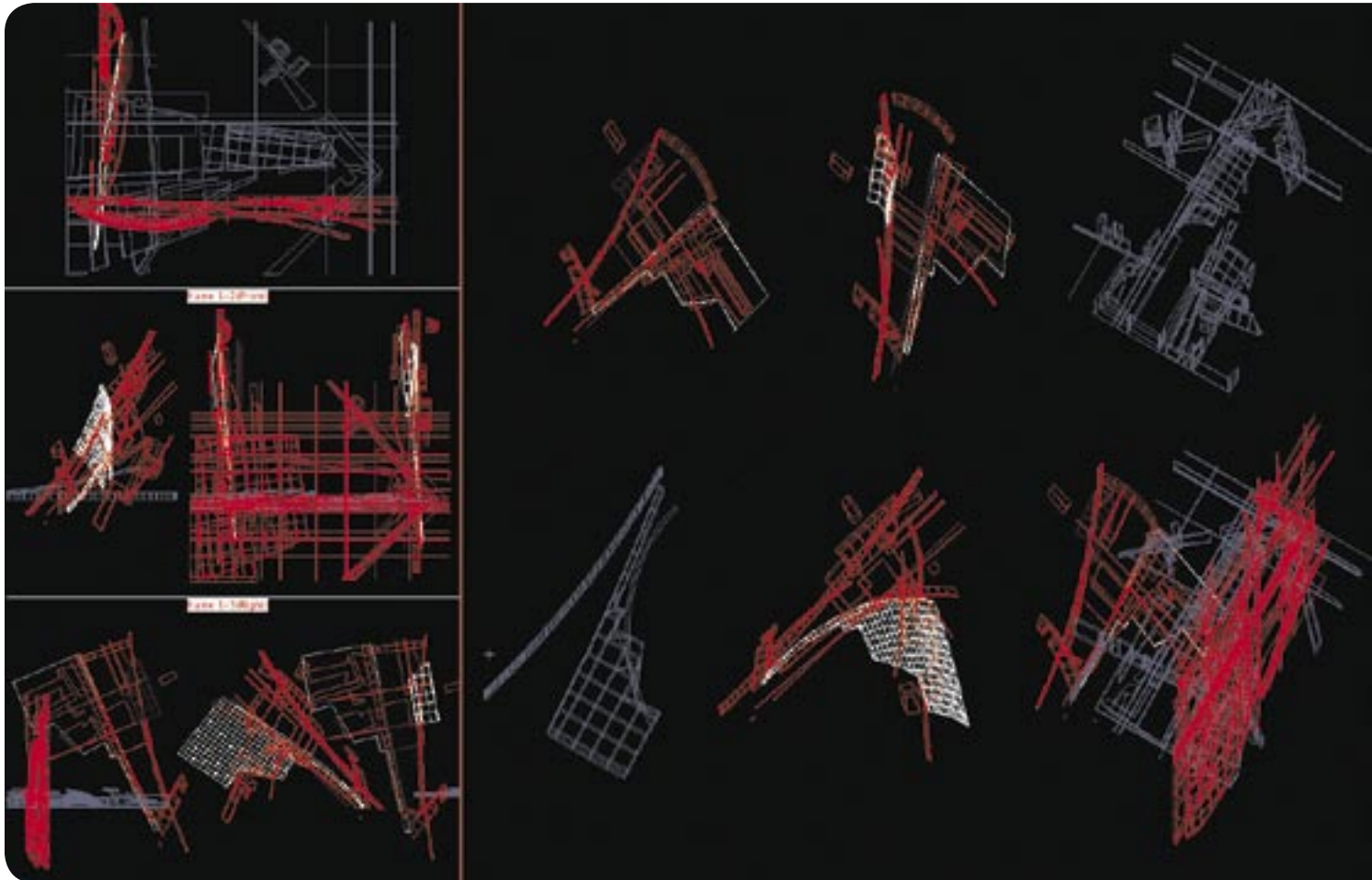Fig. 03. Digital reconstruction and analog diagrams: C.J. MACQUARRIE.

Fig. 05. Digital reliefs and the configuration into a digital light box: MICHAEL MAGEE.
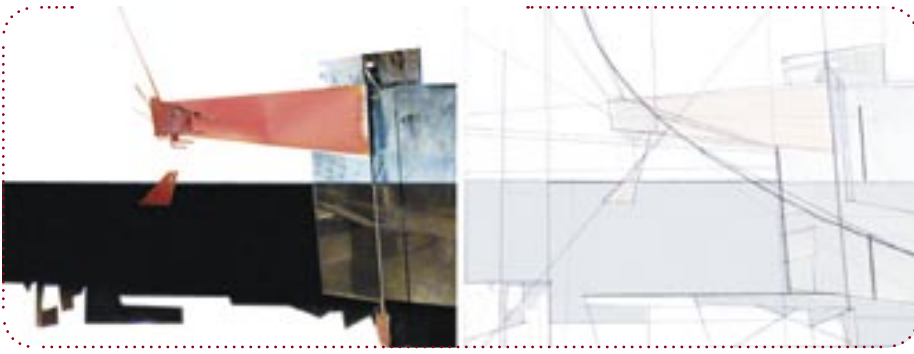
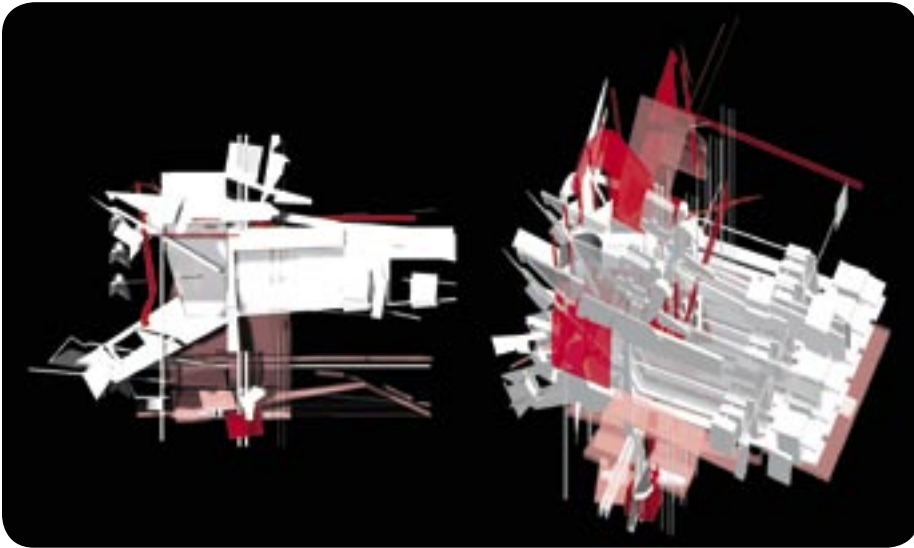Fig. 04. Digital reconstruction and analog diagram: OMAR GARCIA.

Fig. 07. Digital relief and digital light box: C.J. MACQUARRIE.

Working with the hands must remain. But according to new media principles, they must be constantly digitizing, and re-factoring their process with the aid of tools that extend and complete the vision of their work. Moholy-Nagy's precise definitions form a solid foundation that is not only easy to apply, but ideal for a database driven world. In short, these are the potential "parameters" for modulating and controlling the study and feedback between viewers/users of all aspects of design work.

The work shown is from an undergraduate architectural studies seminar taught during fall semester 2004. Earlier graduate level versions of this type of exercise received the *AIA Education Honors Award* in 1994 and 1998. The pedagogy is offered not as the solution, but as a renewed model for basic design, satisfying the demands of students representing a paradigm shift, while acknowledging that architectural education is best served as an open and exploratory liberal art.
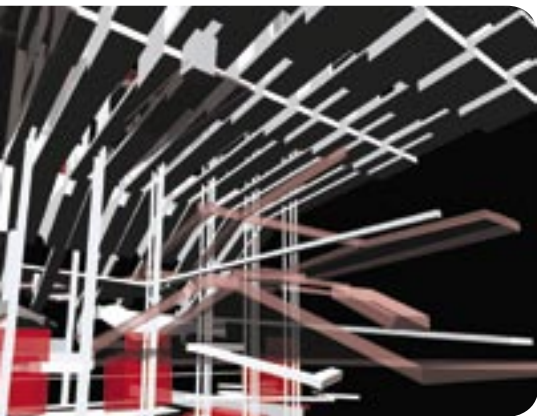
Fig. 06. Digital light box: MICHAEL MAGEE.
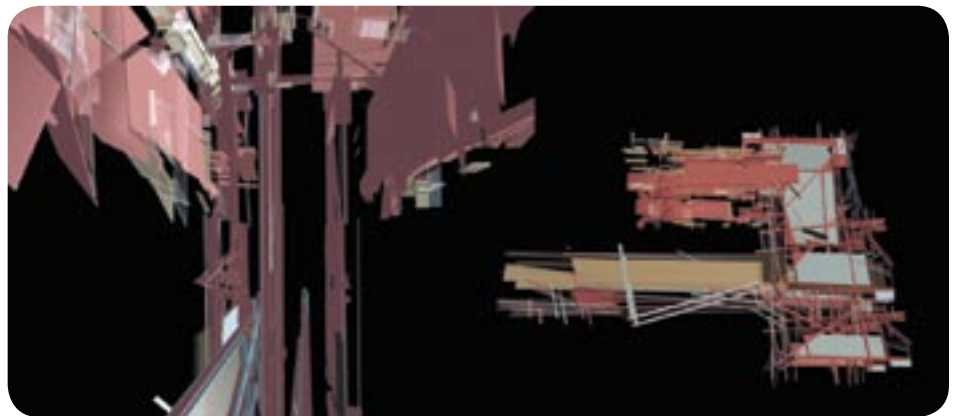

Fig. 08. Rapid seeing: C.J. MACQUARRIE.

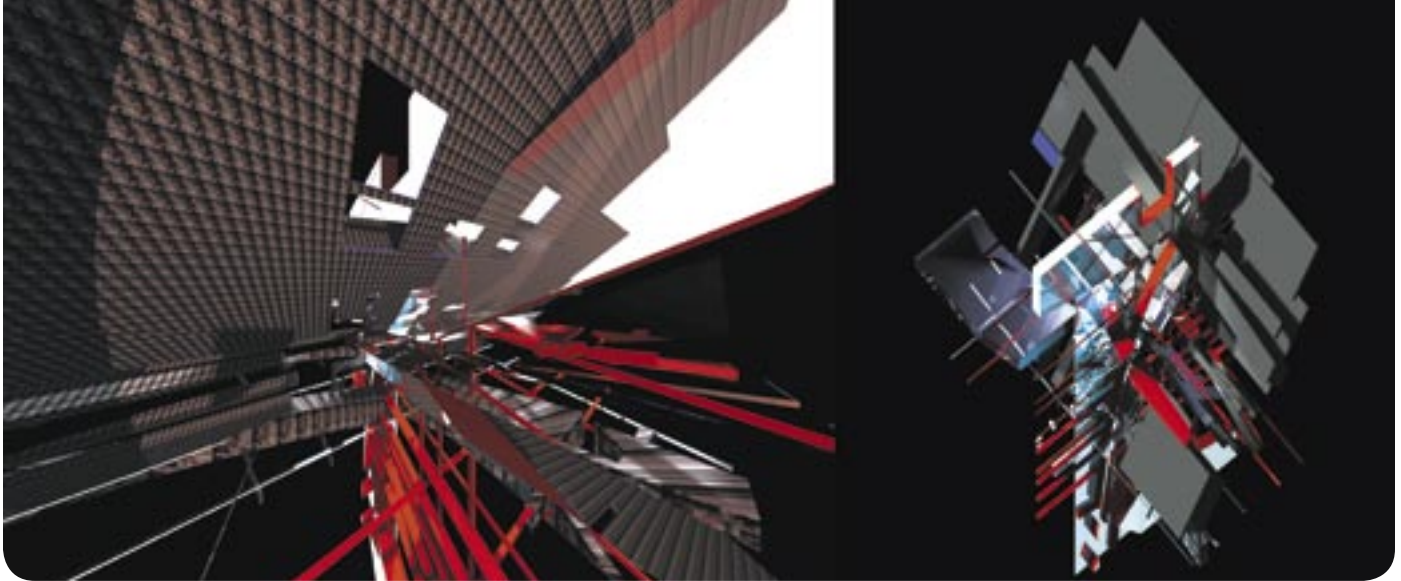Fig. 09. Simultaneous seeing: OMAR GARCIA.

Fig. 11. Distorted seeing: GABE SALAZAR.

THE ANALOG-DIGITAL LIGHT BOX EXERCISE

"The space modulator provides the opportunity to relate design to direct work with materials as against previous architectural methods in which structural inventions were hampered by the shortcomings of visualization on paper alone. On the other hand, structural projects could be solved just as well by working with the model alone; but again this would not give the experience in visualization and development on paper which is essential to the exploitation of a 'space fantasy', one of the main requirements of contemporary architecture."

– Laszlo Moholy-Nagy

The process unfolds as a series of exercises, each with its own set of interrelated experiments, media, and time frames. Teams design and construct an analog light box, according to ideas described in Moholy-Nagy's Vision in Motion. Students are encouraged to think of interesting material combinations and ways of creating movement and interchangeability. They begin the process in the "real physical material world" of three dimensions. Each student harvests a unique vocabulary by isolating, cropping, selecting, and cataloguing a variety of significant fragments, shapes, textures, and colors from digital captures of the analog light box. Working rapidly with new media objects, a series of architectonic reconstructions are fabricated, emphasizing connections and jointure. Numerous sketch diagrams study the hidden geometries of the transcoded image according to several analytic categories such as: orthogonal grid, tension, schema, and interpretive tracing. Students translate these analog diagrams into a vector format. Through the use of **form·Z**'s Boolean operations, the formal possibilities of layer combinations are expanded as digital templates.

Using **form·Z**, digital reliefs are projected from the two-dimensional templates into a beginning three-dimensional study. Students work with solids and voids, and deformations of positive and negative space. Several digital light boxes are visualized by freely re-arranging and experimenting with combinations of elements from the digital reliefs. They discover and record multiple isometrics of the construction and immersive perspective views. They work with color derived from the digital reconstruction source, and experiment with potential transparency, opacity, and translucency. Students produce sectional sequence animations in order to understand the relationship between the form and space of a constructed spatial fantasy.

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Fig. 10. Abstract seeing: Eric Mitchell.