alzheimer’s remediation center:
architecture for research innovation and treatment

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problem statement

how can perceived spaces within a structure affect memory retention?
Unifying idea

Architecture triggers mental changes in its occupants:
A tool which advances treatment and research of Alzheimer’s disease.

**how?**

Claim: Building design can become a versatile instrument in altering mental perception of spaces and triggering changes in memory retention. This will provide researchers a basis to study the disease’s environmental triggers directly in order to advance research of Alzheimer’s disease and its treatment.
With the “baby boomer” generation aging, the number of elderly people in the United States is greatly increasing. “By the year 2030, the portion of the US population age 65 and older is expected to double (20% of total population (Scherr, Alzheimer’s Association)).” As each of us ages, ourselves or a loved one could be affected by this disease which also threatens to bankrupt our federal healthcare budget and increases federal taxes for each of our families. In addition, there is a great shortage of specialized “memory care” facilities for Alzheimer’s patients which also increases cost of medical expenses as well as lowers the quality of life for these individuals.
An assisted living & research center design that acknowledges the physical, emotional, and mental needs of Alzheimer’s patients.
Who?
Meet the client.

Frontal lobe:
Movement, planning, making decisions, reasoning, socialization + personality, problem solving.

Parietal lobe:
Spatial relationships, manipulation of objects, perception of stimuli, reception and processing sensory information from the body.

Occipital lobe:
Visual functions.

Temporal lobe:
Memory functions, emotions, hearing, and verbal response.
research

synergy among researchers -- encouraging innovation

spatial organization -- direct similarities to mental health facilities

healing -- mental, physical emotional

current AD research methods -- short-term volunteer study

short term patient studies (similar to Cetero research)
all studies are volunteer patient or lab/drug testing
full patient awareness upon consent

Kirbride Plan

atriums
group spaces for collaboration
open plan concepts

double loaded corridors
frequent seating + open areas
patient grouping

increased natural daylighting
green space-interior + exterior
emergency units
directives

how can design respond to these known evidences?

- by selection of a site which is both private, safe, easily accessible to the public, and in close proximity to the Mayo Clinic
- by raising public awareness through creation of an innovative research icon
- by using pathways which encourage residents to pass by certain spaces and direct them away from potentially hazardous areas
- by increasing the amount of lighting for visual impairment without the extremities of direct glare or overly reflective surfaces
- by encouraging social interaction between solitary residents or residents who are socially introverted
- by limiting sound transmission through all interior partitions of the building
- by adding unique and differentiating visual features at seating areas in corridors to spark memory change
- by engaging the public through Alzheimer’s Disease education spaces
- by design which makes the most of limited mobility and physical impairment
**Why?**

- **Need**
  - Area with high prevalence of AD

- **Research**
  - Area with high number of medical and research specialists

- **Public Education**
  - Most tourism to area comes from medical visits

- **Build upon existing**
  - Existing Mayo Clinic Alzheimer’s Disease Research Center- Sister Facility
    - Education
    - Research
    - Care

- **30 AD Research Centers exist across country**
Current research focus

- Ways to predict Alzheimer's disease
- Improve diagnostic techniques
- Identify high risk individuals
- Develop analytical tools to aid in the search for preventative treatments and eventual care

“We are studying the total spectrum of cognitive changes that develop in aging.”

— Ronald C. Petersen, M.D., Ph.D.  
[Director of Mayo AD Research Center]
**current research methods**

**clinical trials**
Test interventions such as drugs or devices as well as prevention methods and changes in diet or lifestyle.

**clinical studies**
Use long-term observation and analysis in large groups to determine how a disease or condition may occur and progress.

- Patient is free to go home as there is no long-term stay available.
- Similar to Citero Research studies.
- Short term studies or unsupervised longer term.
- Studies persons at high risk for AD to research trends in prevalence.
- Patients are free to come and go as they please.

What advantages does a sister facility hold?
**Directives**

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process

- create permeable borders which still enforce security
- encourage pathways and relationships between certain spaces
- form spatial relationships and synergy between building users

central CORE from which all of these relationships originate

entries must be defined
process
form finding

iconic building

core

evolve

retain
by using pathways which encourage residents to pass by certain spaces and direct them away from potentially hazardous areas.
sustainable design
exemplifying the idea of innovation

Increasing the amount of lighting for visual impairment without the extremes of direct glare or overly reflective surfaces.

green roof system

architectural screen

horizontal louvers

solar gain mitigation
passive systems

summer afternoon rays deflected
morning + dusk heat gain

trombe wall gradual heat release

increasing the amount of lighting for visual impairment without the extremes of direct glare or overly reflective surfaces.
sustainable design
energy supply systems
coordination of passive and active systems

ground source heating
closed loop geothermal system

VAV HVAC system
typical ductwork plan layout

return air
supply air

sustainable implementations
heating + cooling
**exterior materials**

**existing regional materials**
- metal bridge railing
- concrete retaining wall & rusted metal railing
- natural limestone building finish
- curtainwall + aluminum mullions

**exterior materials**

inspired by existing site materials

- Trespa Wall Panel
- Corten Steel
- Wood Cladding
- Horizontal Cedar Wall Panel

**weathering**
building structure

main level

second level

third level
How can design address

- safety
- aesthetics
- access
- functionality

as a means of transforming this sea of asphalt into a suitable site?
proposed site

proposed site

drwa perspective view

proposed frontage road

ambulance access + service truck entry

existing bus stop

existing parking entry + public parking

mayo clinic

safety. access. convenience.
Profilo Continuo (Testa di Mussolini) sculpture, terracotta with black glaze, 1933, by Renato Giuseppe Bertelli, 1890 - 1974. [IMW Cat No.: IWM ART LD 5975, Department of Art]
education + multi-use
research
public service spaces
staff locker
fitness + physical therapy + spa
mechanical
public restrooms
clinic
reception
kitchen + dining
storage
therapy + treatment
niche community rooms
activity + recreation + computer cluster
genral office
library
staff overnight
by using pathways which encourage residents to pass by certain spaces [circulation + toilet rooms]

- color coding at toilet rooms
- no dead ends
- visual differentiation at each corridor
- visual cues at different ends of building
- visible elevators + stairs from each corridor
- continuous circulation path [loop]

visibility

circulation
The “rhythm of light” can be noted in the above photo which is a 10 foot gap between units, allowing a shaft of light to infiltrate the hospital patient rooms at all times. Circulation corridors cut through the two wings and also take advantage of the natural lighting this break in facades brings.

research

Researchers can observe memory changes in residents doing a variety of activities such as tactile tasks (gardening) and socializing.
Residential units in an assisted living facility should be organized with consideration toward grouping comparable residents in approximating areas.
directives

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- by increasing the amount of lighting for visual impairment without the extremities of direct glare or overly reflective surfaces
- by adding unique and differentiating visual features to spark memory change with careful consideration of material selection
- by limiting sound transmission through all interior partitions of the building
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- by design which makes the most of limited mobility and physical impairment
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color coded corridors and restrooms
material selection outside of the blue violet color spectrum
unique attractions at opposite building ends to distinguish room location
by limiting sound transmission through all interior partitions of the building.
A more enriched and differentiated spatial layout of social spaces in care facilities could generate positive consequences for social interactions, positive affect and overall well-being.

Keith Diaz Moore, Farhana Ferdous
Spatial Configuration and Social Life for People Experiencing Dementia
University of Kansas, Lawrence, KS
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- by engaging the public through Alzheimer’s Disease education spaces.
- by harnessing memory changes through spaces for research collaboration and studies.
Past research done in a hospital setting (Ulrich 1984) uncovered the result that patient views of nature as opposed to non-natural elements improved quicker recovery time, lessened pain, reduction in physiological stress, and mood improvement.
by design which makes the most of limited mobility and physical impairment.
by engaging the public through Alzheimer's Disease education spaces
by harnessing memory change observations through spaces for research collaboration and study
conclusion.

thank you!