

# Scientific Poster

SOS poster

1

## Examples

- <https://inchemistry.acs.org/college-life/research-poster-infographic.html>
- <https://www.animateyour.science/post/best-examples-of-scientific-posters>
- <https://piktochart.com/tips/scientific-poster-examples>
- <https://venngage.com/blog/scientific-poster-examples/>
- <https://ur.umbc.edu/poster-presentation-examples/>
- <https://www.utexas.edu/ugs/our/poster/samples>

2

# SOS Poster

## Avoid

- Paper on a poster format
- Too much text
  - Only the essentials
  - Remove unnecessary details
- Excess of color / combinations
- Intense background

## Ideal

- Be seductive
- Creative communication of research
- Clear structure (flow) of information
- Images and charts (visuals) instead of text
- Initiate communication
- Handouts can help

## Elsevier tips

# TIPS FOR DESIGNING BETTER RESEARCH POSTERS

Research posters are a common way to show the results of a project in the academic community. Researchers present posters at conferences as a way to communicate their work in a summarized way to a broader audience. The research poster must be clear, concise and attractive in order to generate discussion and feedback from colleagues. However, it is not easy to achieve those goals when putting all the information in a layout. Here are some tips to help you design effective research posters that stand out.

## PREPARATION

Before creating your poster you should consider the following questions:

- What is your target audience?
- What is your message?
- What does your viewer need to know?

Once you've decided on the main content, make a rough draft or storyboard with the information, tables and graphics you need.

## TEXT

Keep in mind that important information should be readable from about 3-5 meters away and attract interest from about five meters.

- Use bullets, numbering, and headlines; make it easy to read. However, do not add bullets to section headings; better use a bolded, larger font for section headings.
- Avoid blocks of text longer than 10 sentences.
- Use a sans-serif font like Arial or Helvetica and keep size around 24 - 30pt, subheadings around 40 pt and body text around 24 pt.
- Sometimes less is more, avoid any three-dimensional text or graphic.

## PRINTING AND PRESENTING

Save the file in a PDF format with the correct size, if possible print a draft first and double check for mistakes.

Consider preparing handouts of your poster.

References:

- <http://pubs.acs.org/journal/coster-design>
- <http://www.scribbr.com/blog/2016/06/20/creating-effective-academic-posters/>
- <http://www.researchposters.net/submit/1-148754874131879>

## LAYOUT

Don't cram everything too tightly into the space. Aim for a word count of about 300 to 800 words.

Use "negative" areas and create a grid to give your content room to breathe.

Find a focal point that will help draw your viewers in.

## FIGURES AND GRAPHICS

Use diagrams, graphs or flowcharts to help explain complex information visually.

Keep content at a 30/70 ratio of graphics to text.

Keep in mind the resolution of your graphics, use at least images with 150 dpi and larger than 300.

Images that look good online may not be high enough resolution to look good in print at the size you want to make it.

## COLOR

Try to use no more than five different colors or gradients.

Stick to a 3-5 color palette.

Avoid using unnecessary and distracting background textures or decoration.

Use a plain and light color background, deep blues and black backgrounds often produce posters that are too dark and difficult to read.

## SOFTWARE

Microsoft PowerPoint is the popular, easy-to-use software. However it is not the best option for poster design.

Adobe InDesign and LaTeX are the best options for text editing and layout but can be complex to use. Another option is Beamer presentation software. Beamer or Prezi might be perfect for online and graphs.

# A poster is not a paper



5

# A poster is not a slide set



6

- A good example  
<http://ashkuff.com/blog/?p=18>



KU LEUVEN

7

**Title of Poster**  
Author's name, Author's name, Author's name  
Name of Division, Department, Institution, City, State

**Introduction**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Abstract**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Data**

**Method**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Figures**

**Captions of Figures**

**Results**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Results continued**  
In hac habitasse platea dictumst. Ut magna odio, vestibulum sit amet, ullamcorper nec, convallis eget, enim. Cras a libero. Duis eros risus, vehicula a, feugiat sit amet, venenatis aliquet.

**Conclusion**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**References**  
Author: article journal, page, date  
Author: article journal, page, date  
Author: article journal, page, date

- Align
- Uniform
- Balance

**Title of Poster**  
Author's name, Author's name, Author's name  
Name of Division, Department, Institution, City, State

**Introduction**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Abstract**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Data**

**Method**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Figures**

**Captions of Figures**

**Results**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**Results continued**  
In hac habitasse platea dictumst. Ut magna odio, vestibulum sit amet, ullamcorper nec, convallis eget, enim. Cras a libero. Duis eros risus, vehicula a, feugiat sit amet, venenatis aliquet.

**Conclusion**  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent eu est ut orci sagittis fringilla.

**References**  
Author: article journal, page, date  
Author: article journal, page, date  
Author: article journal, page, date

KU LEUVEN

8



- Title too small
- Different text boxes do not form a unit
- Contrast between dark background and white text box is too intense
- Left part: too much text

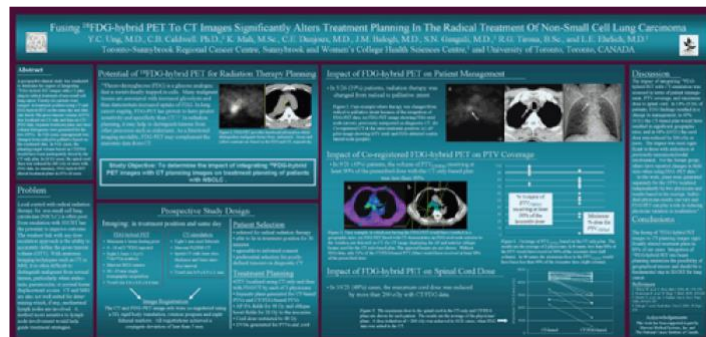
- Clear title
- Large text box forms a unity
- Images aligned
- Pale colors are more eye friendly
- Balanced by spreading the image and the chart

<http://www.fes.uwaterloo.ca/computing/help/posterdesign/PosterCreation.pdf>

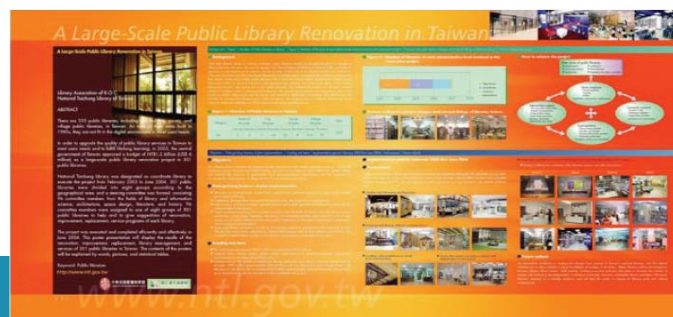
KU LEUVEN

9

- Trop is Teveel
- exhausting



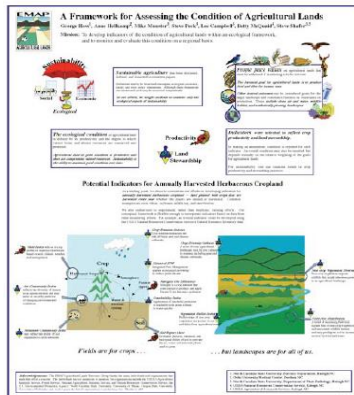
- Contrast
- Different backgrounds distract



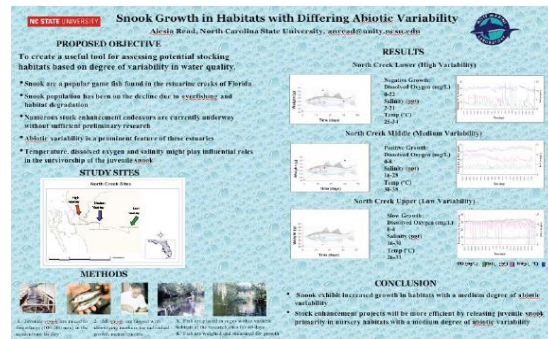
KU LEUVEN

10

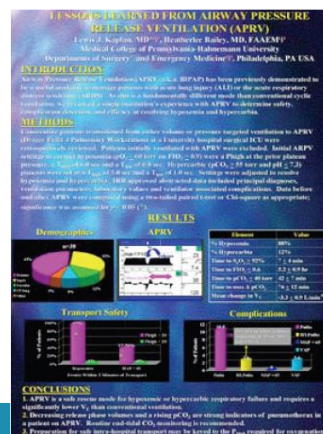
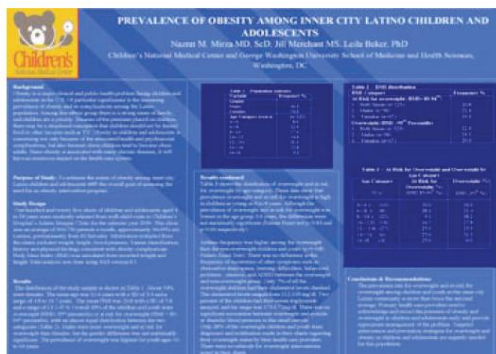
- Where to start?



- Careful with standard PowerPoint background



- Dark background
- Contrast
- Gradient







[pursuitofperformance.blogspot.be/2010/12/scientific-poster-pilot-study-tracking.html](http://pursuitofperformance.blogspot.be/2010/12/scientific-poster-pilot-study-tracking.html)

[blogs.warwick.ac.uk/researchexchange/entry/poster\\_designing\\_a](https://blogs.warwick.ac.uk/researchexchange/entry/poster_designing_a)





## Inorganic Biochemistry of Iron Proteins

Jared J. Heymann, Claire J. Parker Siburt, Katherine D. Weaver, and Alvin L. Crumbliss

Duke University – Department of Chemistry – Durham, NC

**Purpose:**  
To study iron protein biochemistry from the perspective of the Iron Protein = Ligand

### TRANSFERRIN

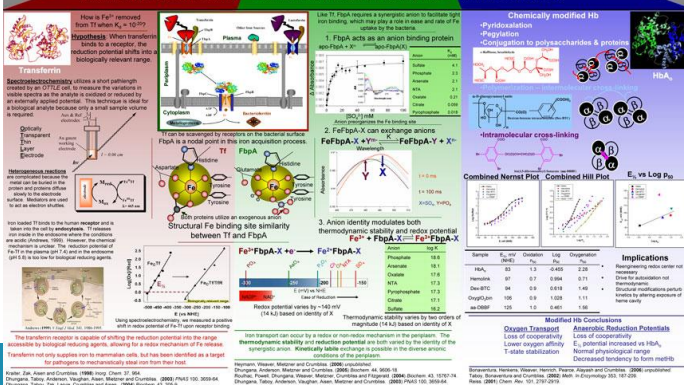
A mechanistic study of the iron release by receptor-bound transferrin using spectroelectrochemistry

### FERRIC BINDING PROTEIN

Role of a synergistic anion on modulating iron uptake in a bacterial transferrin by pathogenic bacteria: A study in kinetics and thermodynamics

### HEMOGLOBIN

Effects of subunit cross-linking on hemoglobin oxidation states determined by spectroelectrochemistry



KU LEUVEN

18

## MÉCANIQUE QUANTIQUE EN CHUTE LIBRE

Vers des mesures ultra-précises des mouvements

I.C.E. Interférométrie à source Cohérente pour applications dans l'Espace

INSTITUT d'OPTIQUE GRADUATE SCHOOL

ONERA THE FRENCH AEROSPACE LAB

l'Observatoire de Paris SYRTE Systèmes de Référence Temps Espace

cnes CENTRE NATIONAL D'ETUDES SPATIALES

**Ondes et particules**  
- Particules = boules de billard  
- Ondes = vagues  
2 particules au même endroit s'additionnent :  
On observe toujours 2 particules.  
2 ondes interfèrent :  
La superposition d'ondes peut être nulle.

**Mesures Interférométriques**  
On peut mesurer le décalage relatif acquis par les 2 ondes en regardant l'amplitude de leur interférence.

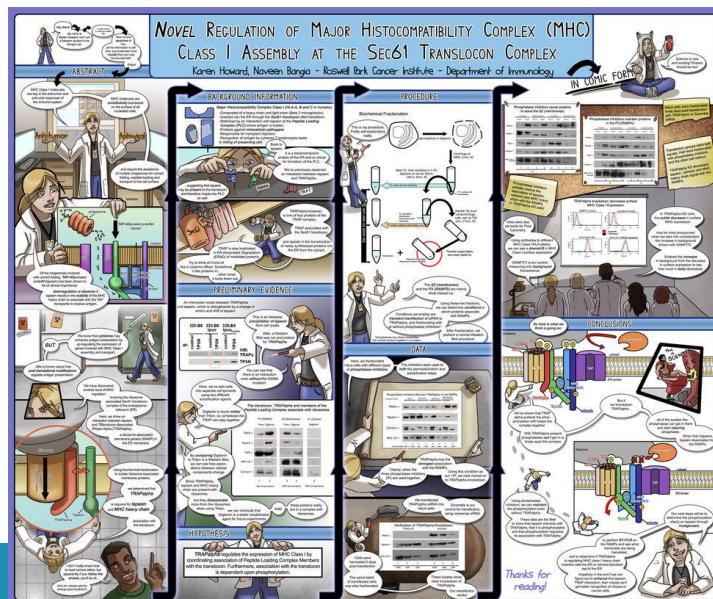
**Interférométrie atomique**  
- Les atomes sont des très petites ondes à température ambiante,  
- Mais quand on les refroidit :  
- A très basses températures les atomes se comportent comme des ondes, on peut les utiliser en interférométrie.

**Mesures de mouvement par la chute de masses**  
Pour mesurer l'accélération d'un avion, il suffit de regarder la chute d'un objet :  
- Si l'objet semble immobile par rapport à l'avion, celui-ci chute avec l'accélération de la pesanteur.  
- Si l'objet par sur la droite, l'avion tourne à gauche.  
- Si l'objet chute avec l'accélération de la pesanteur, l'avion a une vitesse constante.

**Accélérométrie atomique**  
1 Un nuage d'atomes est lâché en vol libre.  
2 On le sépare en deux paquets de vitesses initiales différentes par une impulsion laser.  
3 Deux autres impulsions lasers permettent de recombiner les paquets.  
4 Le décalage entre les deux trajectoires est lu par interférence.  
- Cela permet de remonter à l'accélération du référentiel de l'expérience.

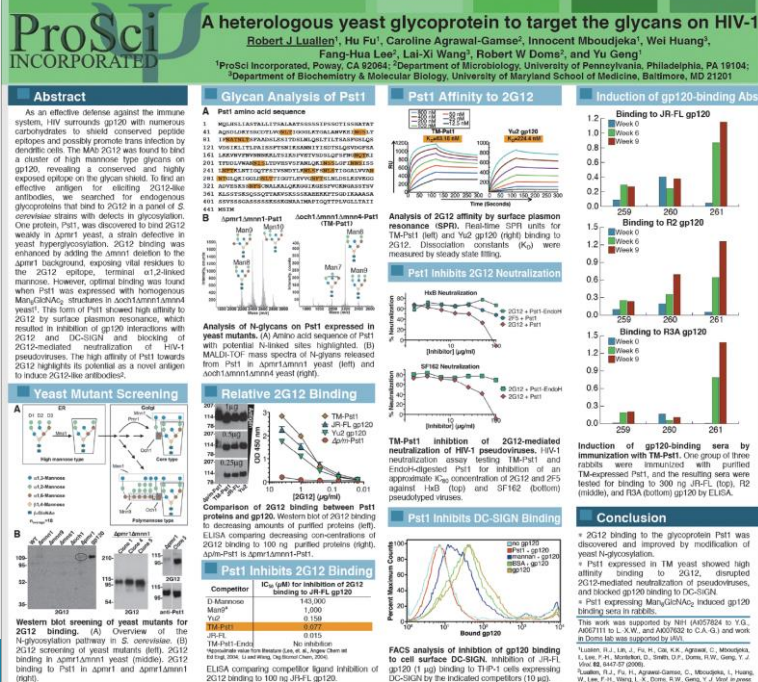
KU LEUVEN

19



KU LEUVEN

20



KU LEUVEN

21



# Molecular Nanomachines

Lorenzo T. Flores, Matthew J. Comstock, Armen Kirakosian, Jongweon Cho, Michael F. Crommie  
Department of Physics, University of California, Berkeley

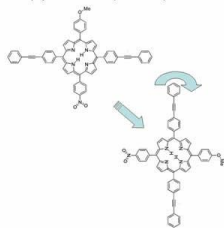
## Abstract

Using Scanning Tunneling Microscopy under UHV and temperatures between 90 to 270K, various functionalized porphyrin molecules are deposited on the Au(111) and Si(111) surfaces. This work is in its preliminary stages; however, results in the Au(111) case indicate that the porphyrin molecule adsorbs in herringbone corners. This observation is in accordance with other researchers.

## Nanomachines

Different molecules and atoms, such as porphyrin and indium, can act as nanomachines. Their chemical compositions, as in the case of porphyrin its dipole moment, allow them to be mechanically manipulated. This would allow for complex systems to be created on an atomic scale. In order to accomplish this we must first successfully deposit these molecules and atoms on a surface and investigate how they orient themselves on the base lattice structure. After this is understood, research on manipulating the placement and activity of nanomachines can begin.

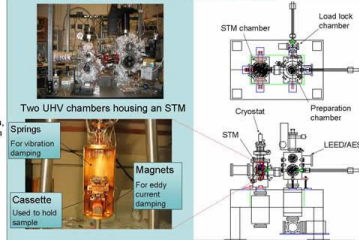
Porphyrin molecule 1 (Yuefei Tao)



## Materials and Methods

### Scanning Tunneling Microscope (STM)

In order to view surfaces we use Scanning Tunneling Microscope (STM). An STM consists of two UHV (Ultra High Vacuum) chambers. One for preparation, the other for microscopy.



### How the STM works

We apply a voltage between an atomically-sharp metallic tip (eg. etched tungsten) and a conducting surface, then bring them to within a nanometer of each other. Electrons tunnel across the gap between the tip and sample. How they tunnel, from tip to surface or surface to tip, depends on the sample bias. The tunneling current is exponentially dependent on the tip-to-sample gap. We use an electronic feedback system to maintain a constant tunneling current as we scan the tip across the surface. The topographic image that we obtain records the height necessary to keep a constant current across the surface.

Exact same surface, Si(111) 125 X 125 Å<sup>2</sup>, under different sample biases and the same tunneling current (0.5 nA):



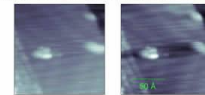
### Other STM uses

The STM can also be used for spectra analysis, in which the tip is held over one point. The sample bias is then increased and the tunneling current is monitored. The data obtained tells us what voltages yield overlapping wave functions.

## Data Analysis

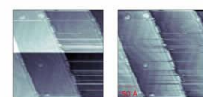
In ideal conditions the image will appear flat with very fine detail. However, the STM is very sensitive and not all physical activity can be controlled. For instance, if the sample is sitting at an angle there appears to be a smooth transition from dark to light. My responsibility for this summer has been to help develop software that will alter scans in order to account for erroneous activity.

### Image corrected using plane and best-fit line subtraction.



Possible porphyrin on Au(111) @ 2.75V, 0.5 nA and 135.3 X 135.3 Å<sup>2</sup>

### Image corrected using offset and best fit line subtraction



Possible porphyrin on Au(111) @ 2.75V & 0.5 nA & 400 X 400 Å<sup>2</sup>

## Results

Work on nanomachines using functionalized porphyrin is still in its beginning stages. Preliminary data indicates that porphyrin tends to adsorb in herringbone corners, as seen in the above figures. This observation is complex with other researchers.

The next step would be to continue depositing porphyrin and viewing how it situates itself. Once there is a better understanding of this activity research can begin on manipulating it to act as a machine.

References:

KU LEUVEN



## Persistent Pain in Assisted Living Facilities

C.A. Kemp, BSN, RN, BC; L.L. Miller, PhD, RN; H.M. Young, PhD, GNP, FAAN; S.K. Sikma, PhD, RN



## What We Learned

Older adults with persistent pain living in assisted living facilities are more likely to have fallen in the previous year and require assistance with mobility.

### Background

- Persistent pain is a common, debilitating condition among older adults regardless of residence<sup>1</sup>
- Assisted living facilities (ALFs) are the fastest growing segment of the senior housing market<sup>2</sup>

### Purpose & Aims

This study describes the phenomenon of persistent pain in older adults residing in eight ALFs in Washington & Oregon

### Aims

- Compare demographic characteristics, cognitive status, ADL function, & number of falls in past year in the pain group & non-pain group
- Describe analgesic orders of the pain group

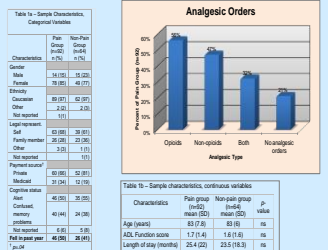
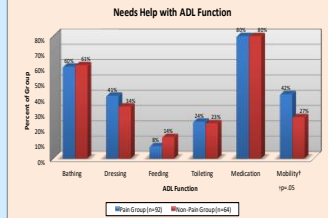
### Sample

- 156 residents from the Medication Management in Assisted Living Facilities study (NINR R21 NR009102-01) participated in this study
- Pain group (n=92, 59%) vs. non-pain group (n=64, 41%)
- Pain group inclusion criteria:
  - Routine or PRN opioid analgesic order OR
  - Routine (once daily) non-opioid analgesic order OR
  - Pain-related diagnosis (e.g., arthritis, sciatica, "knee pain")

### Methods

- Secondary data analysis
- Cross-sectional, descriptive design

### Results



### Discussion

- Prevalence of persistent pain in sample (59%) matches prevalence of persistent pain in other studies with older adults
- All residents required assistance with 1 to 2 ADLs on average; however, residents in the pain group required significantly more assistance with mobility
- 50% of residents in pain group fell in past year compared with 41% in non-pain group, although difference was not significant

### Next Steps

- Examine correlations among falls, mobility, and analgesic orders in assisted living residents
- Describe changes in analgesic orders over 6-month period of parent study
- Examine impact of analgesic order changes on number of falls and assistance with mobility

### Limitations

- Research questions formulated based on available data
- Data collected by chart review with minimal data verification
- Cross-sectional design prohibits analysis of changes over time or causal effect

### Acknowledgments

NINR R21 NR009102-01  
John A. Hartford Building Academic Geriatric Nursing Capacity Pre-Doctoral Scholarship

KU LEUVEN





## WHEN BAD THINGS HAPPEN TO OLDER PEOPLE: THE ROLE OF INTERVENING EVENTS ON THE DEVELOPMENT OF DISABILITY

Thomas M Gill MD, Heather Allore PhD, Theodore R Holford PhD, Zhenchao Guo PhD Yale University School of Medicine

### WHAT WE LEARNED

Illnesses and injuries leading to either hospitalization or restricted activity represent important sources of disability for community-living older persons, **regardless** of the presence of physical frailty.

These intervening events may be suitable targets for the prevention of disability.

### BACKGROUND

A more complete understanding of the disabling process would likely facilitate the development of interventions aimed at preventing disability among community-living older persons.

### OBJECTIVES

To evaluate the relationship between intervening events and the development of disability

To determine whether this relationship is modified by the presence of physical frailty

### METHODS

Prospective study of 754 nondisabled, community-living persons, aged 70+ years

Categorized participants into two groups according to the presence or absence of physical frailty, which was defined on the basis of slow gait speed

Followed participants with monthly telephone interviews for up to 5 years

> to determine the occurrence of disability  
> to ascertain exposure to intervening events, which included illnesses and injuries leading to either hospitalization or restricted activity

Kaplan-Meier Curves for Development of Any Disability, Persistent Disability, and Severe Disability According to Presence of Physical Frailty at Baseline

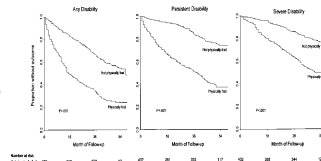


Table 2. Association Between Proximate Intervening Events and Disability Outcomes According to Physical Frailty at Baseline

Proximate Intervening Event	Level of Baseline Physical Frailty	Any Disability	Persistent Disability	Severe Disability
Multivariable Hazard Ratio*				
Hospitalization	All participants	60	44	132
	Physically frail	34	32	93.2
	Not physically frail	117	73	261
Restricted activity only	All participants	5.1	3.3	7.3
	Physically frail	4.1	3.3	5.2
	Not physically frail	6.6	2.9	13

\*All values are statistically significant at P < .001

Table 1. Baseline Characteristics of Study Participants

Characteristic	Any (n=422)	Physically Frail (n=222)	P
Mean age (SD)	73.3 (4.7)	70.4 (3.4)	<.001
Female, n (%)	203 (48.1)	227 (102.0)	.003
Married/partner, n (%)	180 (42.6)	100 (45.0)	.006
Living alone, n (%)	145 (34.3)	150 (67.6)	<.001
Years education, mean (SD)	12.3 (2.0)	11.3 (1.5)	<.001
Chronic conditions, mean (SD)	1.3 (1.2)	2.2 (1.3)	<.001
Depression (yes/no), n (%)	30 (7.1)/392 (92.9)	17 (7.7)/205 (92.3)	.001

Table 3. Prevalence of Disability

Intervening Event	Any Disability	Persistent Disability	Severe Disability
Hospitalization	60	44	132
Restricted activity only	5.1	3.3	7.3



Table 2. Factors Associated with Development of Any Disability

Factor	Multivariable Hazard Ratio	95% CI	P
Age per each 5 years	1.2	1.2 to 1.5	<.001
Female sex	1.1	0.9 to 1.4	.27
Non-Hispanic white	0.9	0.6 to 1.3	.38
Living alone	0.7	0.5 to 0.9	<.001
Years of education	1.0	0.9 to 1.0	.86
No of chronic conditions	1.1	1.0 to 1.2	.08
Depression (yes/no)	1.3	1.0 to 1.6	.07
Physically frail	1.3	1.0 to 1.7	.03
Proximate intervening events	2.2	1.8 to 2.7	<.001
Hospitalization	60	44 to 78	<.001
Restricted activity only	5.1	3.3 to 7.7	<.001
Disaster intervening events	1.1	0.8 to 1.1	.46
Restricted activity only	1.3	1.0 to 1.7	.03

KU LEUVEN

## Please Don't Measure My "Burden" Duty and Satisfaction Are What Matter to Me



Lyda C. Arévalo-Flechas PhD, RN  
The University of Texas Health Science Center at San Antonio

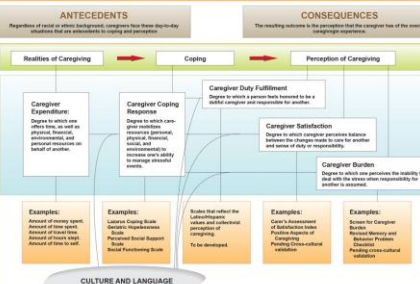


### What We Learned & Where We Are Headed

Measures for burden in the majority population may not assess the same concept in Latinos/Hispanics and other populations. The best measures of the impact of caregiving duties and the interventions to minimize negative effects may lie in concepts that express the impact more positively.

Duty fulfillment and satisfaction are proposed as positive perceptions of what Latino/Hispanic Alzheimer's caregivers experience. Further qualitative exploration of these concepts will provide the basis for instruments to measure these two types of caregiver perception not considered in current theoretical models.

### CULTURALLY INFORMED CONCEPTUAL ORIENTATION OF CAREGIVING



Research supported in part by the John A. Hartford Foundation Building Academic Geriatric Nursing Capacity Program. Special thanks to Asociacion Colombiana de Alzheimer and the caregivers who participated in the study.

### Background

- Burden is not the best way to describe the impact of caregiving on Latino/Hispanic caregivers of a relative with Alzheimer's disease.
- Current models do not consider the role culture and language play in how caregiving is perceived.
- Spanish lacks a word that translates to the English "burden." The Spanish word "carga" translates only to a physical load.
- Neither "burden" nor "carga" are culturally competent words to accurately describe Latino/Hispanic caregiving.

### Assumptions

- Each culture gives people a way to see the world (Spradley, 1979). This worldview is passed from one generation to the next primarily through language.
- More than a way to communicate, language also creates and expresses cultural reality (Spradley, 1979). Ways of perceiving, categorizing, and thinking about one's world result directly from one's language.
- The linguistic (cognitive) categories that make up one's reality and define actions are meanings (Krauss, 2005). Meaning is essential to human life (Frank, 1963). Meaning making allows us to make sense of our lives and experiences, as humans.

KU LEUVEN

**NREL National Renewable Energy Laboratory**  
Innovation for Our Energy Future

**MDO using NanoPSE: Material Design by Optimization using Atomistic Electronic Structure Code for Nanostructures**  
Wesley B. Jones\*, Peter A. Graf\*, Erik Aldredge\*, Lin-Wang Wang\*, Kwiseon Kim\*  
\* National Renewable Energy Laboratory, Golden, Colorado 80401, U.S.A. + Lawrence Berkeley National Laboratory, Berkeley, California 94720, U.S.A.

**Abstract**  
Material design by optimization is the casting of the discovery of materials with specific properties in terms of an optimization problem. NanoPSE, Nanoscale Problem Solving Environment, is a software distribution that we have created which includes the atomistic electronic structure and optimization codes for 15 solvers for the atomistic electronic structure of semiconductor nanostructures and alloys (in the forward problem) and 2) solving the inverse problem using the forward solvers and optimization methods, based on evolutionary algorithms. We present the NanoPSE software distribution and the scientific problems we are investigating. These include the optimization of electronic structural properties of nanoporous carbon nanostructures for potential applications in high efficiency solar cells and the use of optimization for generating surface passivation potentials for electronic structure calculations of semiconductor nanowires. In addition, we present a comparison of optimization methods and direct enumeration for design of semiconductor alloys with specific electronic properties.

**Electronic Structure of Branched Tetrapod Nanocrystals**  
Branched tetrapod nanocrystals are grown experimentally in CdSe, CdTe, CdS, and ZnS. The electronic band (CB) and holes from the valence band (VB) can be located within regions of the nanocrystal due to the combination of electronic structure effects, such as band offset differences between bulk CdSe, CdTe, ZnS, and InGaAs nanowires (NWs) and the nanocrystal's geometry and configuration for possible charge localization. The electronic structure for branched tetrapod nanocrystals is calculated using parallel FCI-MD (5). The unit cell of 24 x 24 x 24 FCI-MD supercell results in FCI-MD of 270 x 270 x 270. The calculation was run on NREL's Vector Linux cluster typically with 12 processors.

**MDO, Material Design by Optimization**  
MDO, Material Design by Optimization, is the casting of the discovery of materials with specific properties in terms of an optimization problem. This includes constraints on the optimization such that atomic configurations are more likely to be physically realizable. The Inverse Band Structure (IBS) problem (6) is posed in searching for atomic configurations in a supercell of semiconductor alloy with desired electronic band structure. IBS solvers based on genetic algorithms, like NSGA-II, are used for searching for atomic configurations in a supercell of semiconductor alloy with desired electronic band structure. We are investigating the changes in electronic structure by varying the size of constituent dots and rods of branched tetrapod nanocrystals. Direct enumeration of the bandgaps and effective masses of all possible candidate-based alloy configurations where unit cell contains up to a specified number of atoms allows us to map the space of bandgaps and effective masses versus alloy composition and atomic configuration (7).

**Using direct enumeration and plotting bandgaps vs effective mass allows us to map the Pareto front of maximum bandgap and minimum effective mass, making material design by optimization more efficient.**

**NanoPSE Software**  
NanoPSE, Nanoscale Problem Solving Environment, is a software distribution containing a set of parallel, integrated and software packages for investigating the electronic properties of semiconductor nanostructures and alloys that include hundreds to millions of atoms.

**NanoPSE design Originally in support of optimization solvers**  
1. Atomistic electronic structure solvers  
2. Integration of solvers and optimization solvers  
3. Search of the solvers and optimization solvers  
4. Parallelization of solvers and optimization solvers  
5. Integration of solvers and optimization solvers  
6. Integration of solvers and optimization solvers  
7. Integration of solvers and optimization solvers  
8. Integration of solvers and optimization solvers  
9. Integration of solvers and optimization solvers  
10. Integration of solvers and optimization solvers  
11. Integration of solvers and optimization solvers  
12. Integration of solvers and optimization solvers  
13. Integration of solvers and optimization solvers  
14. Integration of solvers and optimization solvers  
15. Integration of solvers and optimization solvers

**Future and ongoing features:**  
1. Search of the solvers and optimization solvers  
2. Integration of solvers and optimization solvers  
3. Search of the solvers and optimization solvers  
4. Parallelization of solvers and optimization solvers  
5. Integration of solvers and optimization solvers  
6. Integration of solvers and optimization solvers  
7. Integration of solvers and optimization solvers  
8. Integration of solvers and optimization solvers  
9. Integration of solvers and optimization solvers  
10. Integration of solvers and optimization solvers  
11. Integration of solvers and optimization solvers  
12. Integration of solvers and optimization solvers  
13. Integration of solvers and optimization solvers  
14. Integration of solvers and optimization solvers  
15. Integration of solvers and optimization solvers

**Surface Passivation by Optimization**  
The calculation of the electronic properties of nanostructures must take into account surface effects (SE). We have developed a method of automatically defining possible surface passivation within the context of the empirical pseudopotential method. Our system generates the pseudopotentials for these possible atoms necessary to eliminate surface states near the band edges. It uses the global optimization algorithm (Differential Evolution), which is well suited to this problem. This system offers improved reliability and efficiency compared to previous approaches.

**Acknowledgement**  
Collaborators: Alex Zunger, Jack Dongarra, Gabriel Becker, Alberto Fernandez, Julian Langou, Victor Eijkhout, Andrew Cannon, Don Margues, Sergey Brin, G. L. W. Hart.  
Funding Supported by US DOE - Office of Science - Office of the Biological and Environmental Research, Computational Science Division, and Computational Science program through Lab-05-17 Theory Modeling in Nanoscale Institute under Contract No. DE-AC02-00OR21400.

**Computational resources at NREL, with support by the DOE SC Code Contract No. DE-AC02-00OR21400 and at NREL, Computational Science Center.**

KU LEUVEN

26

## Adapting Five Key Social Instruction Strategies to the CS Educational Environment

Denise Wilson, Ken Yasuhara, Ryan Campbell • University of Washington  
Rebecca Bates, Rachel Seay • Minnesota State University Mankato  
Elaine Scott • Seattle Pacific University



### WHY SOCIAL INSTRUCTION?

Social instruction addresses the changing needs of CS and STEM students in an economy driven by rapid technological innovation and globalization. Information and innovation are now transmitted at a rate beyond the capability of individual learners; globalization has led to more and more diversity in the classroom and the workplace.

To prepare students for these demands, CS and STEM curricula have shifted away from a "lone ranger" approach to learning in favor of collaborative, holistic and interdisciplinary learning models, which leverage teams' collective brainpower, strengths and expertise while fostering and valuing diversity. The more complex the activity, the more team skills are required by the participants. Social learning strategies are key to addressing the demands of 21st-century CS and STEM education.

### CHALLENGE

Making diversity issues concrete and relevant for all students, not just students from underrepresented populations.

### SOLUTION

Mock hiring exercise where identical resumes are presented to students with female and male names, providing an opportunity for discussing conscious and unconscious bias (C'mon, VanDeGrift or ICER 2008)

### CHALLENGE

Concerns about some students "freeloading" off others

### SOLUTION

In pair programming, students alternate frequently between clearly specified, mutually dependent roles: driver and navigator.

### CHALLENGES

Not enough focus on course outcomes; Taking time in class; Professor is the expert, students might give each other incorrect info

### SOLUTION

Students can become experts on something and present to class; More in-depth content coverage is possible and professor can fast check the information. Example: upper-level students each learn an uncommon programming language and compare/contrast advantages.

### CHALLENGE

Too much content to cover to have time for in-class exercises

### SOLUTION

Quick surveys like "What was the clearest idea?" and the "muddiest" point reinforce learning and allow unclear ideas to be addressed before attempting new material.

### CHALLENGE

Gradually reducing scaffolding of the student learning process

### SOLUTION

For novice programmers, completing a program instead of facing a blank file can facilitate early success and a focus on code function.

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION

Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups

### SOLUTION




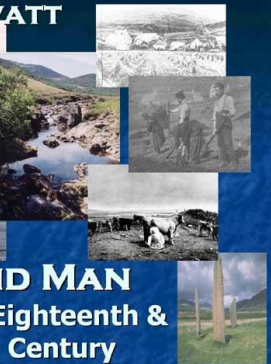
Explicitly valuing diversity to support retention of women and other underrepresented groups

### CHALLENGE

Explicitly valuing diversity to support retention of women and other underrepresented groups



**BY CHRISTINA MILLEN GRAVATT**  
 ENVS 499 April 24, 2006  
 Advisor: Dr. Yvette Bordeaux

**Abstract**

The Isle of Arran, known as Scotland in Miniature, is located in the Firth of Clyde off Scotland's West Coast. Geologically, the Isle is divided by the Highland fault, leaving the northern half of the island dominated by granite peaks with marginal farming areas. Agriculture has been described "as severe change on the landscape". The construction of farmhouses, roads, fencing, dykes, out-buildings, bothies, piggeries, barns, etc. have a profound effect on the environment and landscape.



Eighteenth and early nineteenth-century agricultural practices were conducted in a communal society that used two types of planting methods, lazy beds and run-rigs.

It was the rigs ability to provide drainage that has been a two-edged sword on the landscape of Arran. The island receives 80" to 100" of rain annually. It is channeled by the rigs down the slopes into the burns and rivers. The erosion, leaching of nutrients, and the physical loss of loam filled topsoil have affected the flora on the island. The Age of Enlightenment "Improvers" changed the landscape of Arran reducing the number of small farms, creating a few larger units and opening the landscape to sheep and deer grazing which further altered the landscape.

**Conclusion**

Today the landscape has lost riparian zones, soil, and nutrients, while experiencing significant changes in hydrological patterns altering the shape of the landscape and it is the landscape that entices tourism, now the mainstay of the island's economy. These tourists will form the next major changes to the landscape of the Isle of Arran.

**LAND AND MAN**  
 The Effects of Eighteenth & Nineteenth Century Agriculture on the Northern Half of the Scottish Isle of Arran

KU LEUVEN

28

# A Life of Quality?

Tara L. Nickle, MSW  
 University at Albany, SUNY  
[tn7719@albany.edu](mailto:tn7719@albany.edu)

Systematic review and meta-analysis of interventions relevant to quality of life for persons with intellectual disabilities and dementia

**Background**


Shifts in population, life expectancy, and associated prevalence rates have brought attention to services for persons with intellectual disabilities (ID) and dementia, which are ill-prepared to meet growing needs.

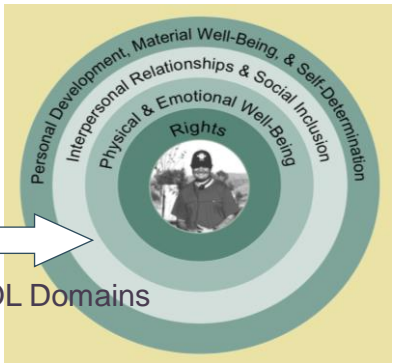
**Aim**

Synthesis of ID literature in order to assess: 1) the effectiveness of psychosocial interventions with QOL-related outcomes, and 2) their relevance for persons who are aging with dementia.

**Methods**

Use of a QOL conceptual framework with targeted domains/indicators (Schalock & Verdugo, 2002). Electronic and hand searches to uncover published studies spanning 25 years from databases, journals, conference proceedings, reference lists, etc. Study selection, quality assessment, and data abstraction undertaken by two independent reviewers. Narrative synthesis of studies and fixed/random effects meta-analyses by classified QOL domain.



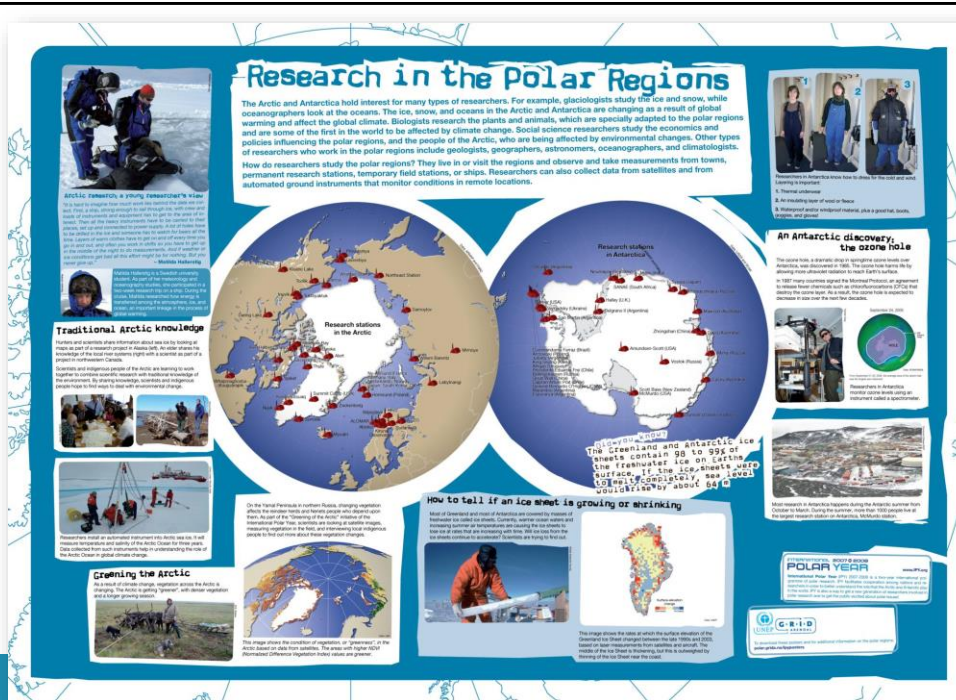


Key QOL Domains

A dissertation funded by the John A. Harford Doctoral Fellows Program in Geriatric Social Work, Administered by the Gerontological Society of America

KU LEUVEN

29



KU LEUVEN

30

# What you hear is

# what you get?

Investigating Absolute and Relative Pitch in L2 Phonology

## Music

Moving on from previous studies linking language learning ability to musical ability, my research takes a more specific look at the musically trained ear and its potential role in second language pronunciation.

This is fundamentally based on the hypothesis that more accurate auditory perception skills are a key to more precise production abilities, thus leading to more native sounding pronunciation and intonation in the second language.

## Speech

Stefanie Anja Wichmann  
 PhD student in Music Technology at the Department of Electronics, Inter-departmentally linked to the Department of Language and Linguistic Science and the Department of Music.

THE UNIVERSITY of York

KU LEUVEN

31

## Who'd live in a house like this?

" WANTED. Families, particularly women and children to work in the Textile Mill. They may be provided with comfortable houses..."

(from an advert placed by mill owner Thomas Evans in 1787)

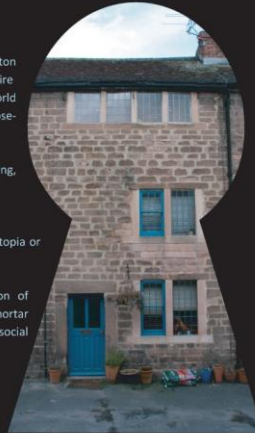
Home of the first water-powered cotton mill, the Derwent Valley in Derbyshire presents a fascinating insight into the world of textile workers living within purpose-built communities.

Employees were provided with housing, schooling and a weekly refuse collection .... but at what cost?

Did these workers live in an industrial utopia or in Blake's "dark satanic mills"?

Through the archaeological examination of building design, we can turn bricks and mortar into an understanding of the economic, social and cultural lives of these communities.

Join me as we go through the keyhole to examine the homes of the working-class.



Suzanne Lilley  
Department of Archaeology

THE UNIVERSITY of York

KU LEUVEN