



2022 Summer Scholars WFIRM Program

Thursday, June 2nd to Friday, August 5, 2022

*Multidisciplinary Undergraduate Summer Research
Experiences in Translational Regenerative Medicine*

WELCOME PACKET

Program Schedule, Key Dates and Deadlines



Introducing the 2022 WFIRM Summer Scholars

Undergraduate Summer Scholar	Primary Faculty Mentor(s)
Salome Ambokadze Biochemistry, Vassar College	Hooman Sadri, MD, PhD Associate Professor, WFIRM
Brennen Bailey Biomolecular Science and Chemistry, Clarkson University	Young Min Ju, PhD Assistant Professor, WFIRM
Xinyue Gu Applied Mathematics and Statistics, Molecular and Cellular Biology, John Hopkins University	Shay Soker, PhD Professor, WFIRM
Katelyn Hamasaki Biology, Amherst College	Stephen Walker, PhD Professor, WFIRM
Hayden Johns Biology, Utah State University	James Yoo, MD, PhD, Professor, WFIRM Sang Jin Lee, PhD, Associate Professor, WFIRM
Lucy Kamlewechi Biomedical Engineering, Alabama State University	Graca Almeida-Porada, MD, PhD Professor, WFIRM
Taylor LaValley Biomedical Engineering, Miami University	Christopher Porada, PhD Professor, WFIRM
Jenna Lee Medicine, Health, and Society, Vanderbilt University	Shay Soker, PhD Professor, WFIRM
Audrey MacDonald Biochemistry and Molecular Biology, Wake Forest University	Josh Maxwell, PhD Assistant Professor, WFIRM
Collin McGuirt Biology, Davidson College	Anthony Atala, MD Professor and Director of WFIRM
Jake Miller Microbiology and Cell Science, University of Florida	Emmanuel Opara, PhD Professor, WFIRM
Lauren Morris Biomedical Science and Computer Science University of Central Florida	Johanna Bolander, PhD Instructor, WFIRM

Undergraduate Summer Scholar	Primary Faculty Mentor(s)
Kelsey Masshart Genetics, Clemson University	Baisong Lu, PhD Associate Professor, WFIRM
Luana Sueko Peres-Damjanovic Chemical Engineering, North Carolina Agricultural and Technical State College	Sean Murphy, PhD Associate Professor, WFIRM
Samuel Pomper Biology, University of North Carolina at Chapel Hill	Victoria Weiss, PhD Instructor, WFIRM
Phoebe Rodda Psychology and Medical Anthropology, University of North Carolina at Chapel Hill	Vijay Gorantla, PhD Professor, WFIRM & Surgery
Jacolby Roddey Biology, North Carolina Agricultural and Technical State College	Robert H. Newman , Associate Professor College of Science and Technology, North Carolina Agricultural and Technical State University
Alexander Shepard Biomedical Engineering, University of Arkansas	Sang Jin Lee Associate Professor, WFIRM
Rebecca Van Kirk Biological Sciences, University of Chicago	Ji Hyun Kim, PhD Assistant Professor, WFIRM
Grayson Wagner Biomedical Engineering, Yale University	Anthony Atala, MD Professor and Director of WFIRM
Yutong Wang Biochemistry and Molecular Biology Wake Forest University	Yuanyuan Zhang, MD, PhD Associate Professor, WFIRM
Emma Warner Biomedical Engineering, University of Miami	Graca Almeida-Porada, MD, PhD Professor, WFIRM

WFIRM Summer Scholars 2022 Program Schedule with Key Dates

Thursday, June 2

Note: Students do this on their own after Welcome Zoom per instructions provided by Mrs. Terri Bowen. Contact: 336-713-7293; tbowen@wakehealth.edu

8:30 am – 9:15 am

Welcome and Overview with Joan Schanck, Summer Scholars Program Director

ZOOM Virtual Welcome!

Join Zoom Meeting

<https://us02web.zoom.us/j/86068824796?pwd=WVJ0eUw1U2JDS3FCZyt4b3krQ2FhZz09>

Meeting ID: 860 6882 4796

Passcode: 862022

Note: *Students to have completed on-line orientation for access to WF Baptist Medical Center and to obtain badges per instructions provided by Mrs. Terri Bowen, WFIRM. You do not have to go to the badge office at the Wake Forest Baptist Center. We will distribute your badges to you at the Wake Forest Institute for Regenerative Medicine*

WFIRM Location: Richard H. Dean Building, 391 Technology Way, Winston-Salem, NC 27101

DATE & Time TBA

Director's Welcome, Dr. Anthony Atala (Badges disseminated)

Location: Wake Forest Institute for Regenerative Medicine (WFIRM)

Richard H. Dean Building, 391 Technology Way, Winston-Salem, NC 27101

1:30 pm – 2:30 pm

Scholars meet WFIRM team and Mentors at WFIRM

WFIRM Outside Patio Area (weather permitting) or 2nd floor Collaboration Area

2:30 pm – 3:30

WFIRM Lab Orientation: Phase I Overview with Tara Jones, Lab Operations Manager

WFIRM, Richard H. Dean Building, 2nd floor collaboration area

Friday, June 3

Location:

Summer Scholars WFIRM Lab Orientation Phase II

Wake Forest Institute for Regenerative Medicine, Richard H. Dean Building, 391 Technology Way, Winston-Salem, NC 27101.

10:00 am – 11:30 am

Small group specialized training - Break into 3 groups

Location: 2nd Floor collaboration area

- Cell Culture Training
- Imaging Training
- Histology Training

12:00 pm – 1:00 pm

Lunch

Bring your own and remain in WFIRM's 2nd floor Collaboration area of WFIRM, outdoor patio or easy walk into downtown area.

1:00 pm – 1:30 pm

Animal Orientation with Miranda Moore and Amanda Dillard

Location: WFIRM room 335

1:30 pm – 1:40 pm

Break

1:40 pm – 2:10 pm

Vivarium Orientation with Dr. Erin Mitchell via ZOOM

Join Zoom Meeting

<https://us02web.zoom.us/j/83102158830?pwd=cG1STjNENEFwcklFWjlkeFA4elpLdz09>

Meeting ID: 831 0215 8830

Passcode: 138944

Note: Following the Zoom vivarium orientation, Gayle Hodges will enable short vivarium tours and will break students into small groups. Weather permitting, Gayle can meet students in outdoor patio area. If weather is not cooperative, Gayle can meet students in 2nd floor collaboration area

2:10 pm – 2:45 pm **Vivarium Tour** with Gayle Hodges

Note: Required orientation completed. Scholars to continue to meet with mentors and his or her team per individualized instructions.

Monday, June 6 to June 10th

9th Annual RME Course and World Stem Cell Summit (RME & WSCS 2022)

NOTE: Scholars are required to pre-register in order to gain access with links and mobile app to this virtual, global event. See link below and code to waive registration fee

Register for RME & WSCS 2022 at: <https://wfirm.regfox.com/2022-regenerative-medicine-essentials-course-world-stem-cell-summit>

Enter Coupon Code to Waive Fee: WFIRMScholar

Tuesday, June 7

9:00 am – 10:00 am **Hands-on Animal Training Phase II** for MacDonald, Morris, Kasula, and Wagner
Dean Building - IACUC Training Room in the NRC (Nutrition Center) Bldg

2:00 pm – 3:00 pm **Hands-on Animal Training Phase II** for Kamlewchi
Dean Building - Clarkson Campus

Monday, June 13 Summer Scholars Monday Research Meetings begin

9:00 am – 10:15 am **(Scholars Assigned: TBC)**

Faculty leaders: Tracy Criswell, PhD and Steve Walker, PhD

Additional dates: 6/20, 6/27, Tues 7/5 because of 7/4, 7/11, 7/18, 7/25)

Note: Each student attends either the Monday or Thursday weekly reaching meetings. This is project/subject area driven. You will be assigned upon arrival. **Scholars Assigned:** Gu, Hamasaki, Kamlewechi, LaValley, Lee, MacDonald, Miller, Rodda, Shepard and Warner

1:00 pm – 2:00 pm **Lab Notebook and Lab Safety Training, 2nd floor collaboration area**
2nd FI Collab Area Sitta Sivanandane and Pam Shirling

Wednesday, June 15 Summer Scholars Wednesday Seminar Series begin

12:00 Noon – 1:00 pm

Rooms 250A&B

June 15, 2022 – Michael Seeds, PhD, Communicating Science to Others

June 22, 2022 – Josh Maxwell, PhD, Cardiac Regeneration

June 29, 2022 – Emmanuel Opara, MD, PhD, TERM strategies in Kidney and Urologic disease research

July 6, 2022 – Tracy Criswell, PhD, Aging and Gender Issues

July 13, 2022 – Johanna Bolander, PhD, Hypothesis Development/Testing: From a Joint Perspective

June 23, 2022 - **Alternate date of Thursday, June 23, 12:00 pm to noon**

Infertility and RM, Hooman Sadri-Ardekani, MD, PhD,

June 29, 2022 – DOD MOE speaker/NCAT – Robert Newman, PhD; Title: An integrated microengineered organ equivalent (MOE)-based microfluidics system for real-time detection of signaling dynamics and metabolomics profiles

July 20, 2022 – DE&I/Graca HHMI program, **12:00 to 1:30 pm Zoom**

July 27, 2022 – Tom Shupe – body-on-chip, live or PC games and flying! LOL (tentative)

4:30pm – 5:30 pm Wake Forest Summer REU Programs Ice Cream Social – Meet undergraduate students engaged in research across Wake Forest Departments

Location: Outside Bowman Gray Medical Education Building Courtyard (will be moved into 1st floor atrium area if rain)

Thursday, June 16 Summer Scholars Thursday Research Meetings begin

1:00 pm – 2:15 pm
Room 150 TBC

(Scholars Assigned: TBC)

Faculty leaders: John Jackson, PhD and Sang Jin Lee, PhD.

Additional dates: June 23, June 30, July 7, July 14, July 21, and July 28

Note: Each student attends either the Monday or Thursday weekly reaching meetings. This is project/subject area driven. You will be assigned upon arrival. **Scholars Assigned:** Ambokadze, Bailey, Johns, McGuirt, Masshart, Peres-Damjanovic, Pomper, VanKirk, Wagner, Wang

Wednesday, June 29

4:00 pm – 6:00 pm

Social Event – WFIRM Team with/Scholars BBQ Picnic

Location: [Bailey Park, Innovation Quarter](#) (walking distance from WFIRM)

Friday, July 8

12:00 pm – 1:30 pm

Pizza Lunch with Wake Forest School of Medicine Medical Students w/Tour

Leader: Sameh Almousa Class of 2023, WF SOM

Location: [Bowan Gray Center for Medical Education](#)

Firth Floor, Room 5203

475 Vine Street, Winston-Salem, NC 27101

Friday, July 15

11:30 am – 1:00 pm

WFGS Overview/Tour with Lunch

WFU Graduate School of Arts & Sciences, 525 Vine Street

Lunch provided 12pm to 12:30 pm, followed by Presentation and Q&A with Erik Brady, PhD, CHCP, Director of Wake Forest Graduate School

Location: Wake Forest Biotech Place, 575 N. Patterson Ave,

Room 153 A/B reserved from 11:30 to 2:00 p on July 16, 2021

Friday, July 22

Game starts at 7pm

Social Event – WFIRM Scholars and Mentors Attend Winston-Salem Dash Game Rome Braves vs. Winston-Salem Dash Team

Includes Picnic-style dinner on the patio. Details pending.

Tuesday, July 26

Abstract Deadline for Research Day

Wednesday, July 27

Poster Deadline for Research Day

Tuesday, August 2, 2022

2:00 pm – 5:00 pm

Final Research Day Dress Rehearsal (with loading of PowerPoint Presentations)

Location: [Bowan Gray Center for Medical Education](#)

Firth Floor, Multi-Tiered Classroom

475 Vine Street, Winston-Salem, NC 27101

Wednesday, August 3, 2022

8:30 am – 1 pm

Final Research Day with Poster Session

Update: Scholars will provide a 5-minute PowerPoint presentation overview of their work. Following the presentations, will have closing reception and networking.

Location: [Bowan Gray Center for Medical Education](#)

Firth Floor, Multi-Tiered Classroom

475 Vine Street, Winston-Salem, NC 27101

Friday, August 5, 2022

8:30 am – 1:30 pm

OPTIONAL: Wake Forest Biomedical Engineering REU Final Research Day Symposium

Location: Biotech Place Atrium & Auditorium

More details provided mid-July. Contact: Thea Smith

2:00 pm – 3:30 pm

Final Goodbyes w/Exit Interview, Post-Program Survey Completed, Badge Return

Location:

WFIRM Summer Scholars

Visiting Winston-Salem

Check out what to do at: <https://www.visitnc.com/listing/zEiQ/visit-winston-salem-visitors-center>

Note: WFIRM will also be announcing opportunities to socialize with our team conforming to the health and safety of all. We are all looking to meet you and the time we will have together.

Areas of Interest/Ideas:

[Hiking at Pilot Mountain State Park](#)

[Old Salem Museums & Gardens](#)

Historic Town, Salem College; walking distance from WFIRM

[Reynolda House and Art Museum](#)

Free for students and employees of WFBMC

[Southeastern Center for Contemporary Art](#)

Free admission; rotating exhibitions

[Planetarium @ Kaleideum North](#)

Different weekend shows (Museum & Science Center)

[North Carolina Zoo](#)

Location: Asheboro, NC
(60 minutes away)

[Carowinds Amusement Park](#)

Location: Charlotte, NC (90 minutes away)

[U.S. National Whitewater Center](#)

Location: Charlotte, NC
(90 minutes away)

[Visit Winston-Salem Website](#)

Winston-Salem website with a calendar of events

Summer Scholars Final Poster Session Wednesday, August 3, 2022

INSTRUCTIONS FOR PREPARING AN ABSTRACT FOR INCLUSION IN THE PUBLISHED POSTER SESSION PROCEEDINGS MANUAL

Deadline for Submission of Abstract is Tuesday, July 26, 2022

Each WFIRM Summer Scholar must prepare an abstract for the final poster session presentation. An abstract is a condensed summary of the main topics covered in your presentation. Abstracts are to be submitted electronically as a Word document. Students will receive invite to DropBox or Share Point

Size and presentation

- The text of the abstract (not including authors, institutions/affiliations and titles) should be limited to **550 words**, single-spaced. Interns should list *Wake Forest Institute for Regenerative Medicine* as their institutional affiliation and *Summer Scholar* as their title.
- Must be typed single-spaced with 11 point, Times New Roman typeface
- Must be free of typographical and grammatical errors.

Title: Type title in CAPITAL LETTERS. The type should be succinct and clearly state the nature of the research study.

Authors' names: Authors should be listed by surname and initials, with the poster presenter's name marked with an asterisk (*).

Body of abstract: The following are elements should be included in the abstract:

- Brief background
- Statement of objectives and specific aims
- Brief description of research design/methods used
- Data and analysis
- Results and conclusions

References: The abstract should be accompanied by a short list of references which represents the primary sources of information used for the presentation. Place references on the same page as the abstract and give references in standard scientific style.

Abbreviations: Standard abbreviations may be used for common terms. For uncommon terms, the abbreviations should be given in brackets after the first full use of the word.

EXAMPLES

DIFFERENTIATION OF AUTOLOGOUS SUBCUTANEOUS ADIPOSE-DERIVED STEM CELLS TO EPITHELIAL CELLS

*S. T. Lopresti, S. Natesan, D. O. Zamora, N. L. Wrice, R. J. Christy

*Summer Scholar, Wake Forest Institute for Regenerative Medicine

US Army Institute of Surgical Research, 3698 Chambers Pass, Bldg 3611-BHT1, Fort Sam Houston, TX 78234

Combat burn injuries are often full-thickness burns, involving large total body surface areas (TBSA) of skin (1). Epidermal substitutes have been developed using culture expanded keratinocytes to improve wound healing of burns (2). Although tissue engineered epidermal substitutes using autologous keratinocytes are applicable clinically, their use is limited due to time required for culture expansion and amount of standard skin biopsy sample. Adipose-derived stem cells have gained particular attention due to ease of isolation, relative abundance, and multi-lineage differentiation potential (3, 4). We've recently shown that hypodermal tissue present in discarded skin tissue, that are surgically debrided to remove necrotic tissue during surgical procedure, possess stem cells that retain their ability to differentiate into multilineages and can be isolated in quantities that could be used clinically for burn repair and regeneration (4). We hypothesize stem cells from discarded burn tissue can be differentiated into epithelial cells. These differentiated cells can be used to treat burn wounds that lack an autologous epithelial cell source.

In this study, subcutaneous adipose-derived stem cells were isolated from discarded human skin samples (dsASCs) following previously established protocol (4). Immunocytochemical analysis of human dsASCs showed positive expression for stem cell markers; CD54, CD105, and STRO-1. The dsASCs possessed multilineage differentiation ability, as confirmed through their commitment to differentiate into adipogenic and osteogenic, lineages. For epithelial-like differentiation, dsASCs were treated with a combination of inducers and/or growth factors such as keratinocyte growth factor (KGF), epidermal growth factor (EGF), hepatocyte growth factor (HGF), and insulin-like growth factor (IGF), all- trans retinoic acid (ATRA). Passage 2 dsASCs were seeded on top of a type-I collagen hydrogel matrix (70,000 cells/ml of gel), prepared according to the manufacturer's instructions by adjusting the pH to 6.8-7.0. After 48 hours incubation of dsASCs-gel in MesenPro media they were switched to DMEM media containing 5% fetal bovine serum supplemented with above mentioned growth factors and/or inducers. On day 5 the collagen gels were air-lifted to induce cell stratification. Light microscopy photos were taken at different days (4, 8 and 10) and mRNA was isolated at day 2, 4, 8, and 12. Real-time PCR analysis was used to determine the expression levels of such epithelial markers as keratins KRT5, KRT7, KRT8, KRT10, KRT13, KRT14, KRT18, KRT19, involucrin (IVL) and loricrin (LOR).

After treating the collagen gels with induction media, the dsASCs started to align into squamous cell-like morphology by day 4, and when air-lifted exhibited characteristic epithelial-like cuboidal cell morphology by day 10. Differentiating dsASCs expressed low levels (<10 fold) of both simple (KRT7, KRT8, KRT18 and KRT19) and stratified keratin markers (KRT5, KRT10, KRT13, KRT14) at early time points (day 4 and 8). By day 12, the cells exhibited a robust (>50 fold) increase in expression of stratified epithelial cell markers, along with cytoskeletal proteins IVL and LOR, which are responsible for formation of intermediate filaments in skin epithelia. In summary, we showed that stem cells from discarded human burn tissue can be potentially used as an autologous cell source for epithelial cells and differentiated dsASCs can potentially be used for developing regenerative skin products for burn wounds.

References:

1. Wolf SE, Kauvar DS, et al. Comparison between civilian burns and combat burns from Operation Iraqi Freedom and Operation Enduring Freedom *Ann Surg.* 2006;243(6):786-92.
2. Bremner LF, Mazurek M. Reconstructive challenges of complex battlefield injury. *J Surg Orthop Adv* 2010, 19, 77.
3. Zuk PA, Zhu M, Mizuno H, et al. Multilineage cells from human adipose tissue: implications for cell-based therapies. *Tissue Eng* 2001, 7,211.
4. Brzoska M, Geiger H, et al. Epithelial differentiation of human adipose tissue-derived adult stem cells. *Biochem Biophys Res Commun* 2005, 330,142.
5. Natesan S, Wrice NL, Baer DG, Christy RJ. Debrided Skin as a Source of Autologous Stem Cells for Wound Repair. *Stem Cells*, 2011, Jun 14 [Epub ahead of print]

BIOFABRICATION OF FUNCTIONAL SKIN GRAFTS USING A 3DBIOPRINTER

J. A. Marco, C. G. Jeong, J. J. Yoo, A. Atala

Summer Scholar, Wake Forest Institute for Regenerative Medicine

Full-thickness skin wounds and extensive burn injuries are one of the major causes of morbidity and mortality. Globally, 11 million burn injuries are reported per year. Between 1998 and 2007, the overall mortality rate due to burn injuries was 4.9%. Currently, the clinical standard for wound treatment is the use of autologous split-thickness skin grafts. Unfortunately, this requires surgery to remove a portion of the patient's skin and is not applicable to extensive wound coverage. An alternative therapy is the use of allografts, but immunosuppression is used in conjunction with this therapy, leading to increased patient susceptibility to illness and pain.

The application of skin cells onto wound sites to improve wound healing is a promising area of research. This can provide wound coverage with minimal skin grafting as cells can be expanded to cover larger wound areas. Cell printing by a 3D bioprinter has been suggested as a primary form of cell application for wounded skin or skin grafting to cover such larger wound sites. The objective of this study was to create functional skin grafts by printing not only human fibroblasts and keratinocytes but also human papilla cells for hair follicle formation and human melanocytes for skin pigmentation, all with carefully controlled layering techniques. Fibroblasts and papilla cells were suspended in a printable hydrogel containing fibrin. These cells were printed first in order to create the dermal layer. Keratinocytes and melanocytes were suspended in the same hydrogel and were printed second to create the epidermal layer. The constructs were 1cm x 1cm and only two layers thick in order to mimic the thickness of normal mouse skin. Once the constructs were printed, they were cross-linked with thrombin to make the gels stable and firm. The bilayered skin grafts were cultured for 5 days and then implanted onto nude mice.

After a week of in vivo implantation, the constructs showed revascularization and started to mimic the structure of mouse skin. This indicated that the mice were not rejecting the implanted skin grafts. The constructs were also able to maintain their structural integrity during this time and were easily retrieved for analysis. A gel-only group (used as control) was also implanted on each mouse along with cell-seeded hydrogels. The gel-only group did not maintain its structure and was not retrievable after one week. This indicated that the cells within the construct were producing a sturdy matrix. Massons Trichrome staining confirmed the presence of ECM in the cell-containing constructs. Finally, it was noted that the wound size containing construct were slightly bigger than the gel only group, indicating that cells from the surrounding area are not migrating in to close the wound and suggesting that the construct is being allowed to integrate into the skin. Further analysis and relevant results from this study are ongoing. Based on the current data, we conclude that the constructs are capable of forming and maintaining their skin-like structure even after 1 week of in vivo implantation (12 days after printing). Constructs will be retrieved again at 3 weeks in vivo (26 days after printing) in order to examine the structural integrity, to determine if follicles are being formed, and to ascertain if any further pigmentation can be seen.

Acknowledgements: The summer scholars research reported was supported by the Douglas Jerome Bodner Fund for Research in Regenerative Medicine. A special thanks to Stephen L. Rego for technical assistance.

References

1. Peck MD. Epidemiology of burns throughout the world. Part I: Distribution and risk factors. *Burns* 2011; 37:1087–1100.
2. Miller SF, Bessey P, Lentz CW et al. National burn repository 2007 report: A synopsis of the 2007 call for data. *J Burn Care Res* 2008; 29:862– 870; discussion 871.

Guidelines for Poster Preparation

Poster Submission Deadline: Wednesday, July 27, 2022

General Aim and Format

- A poster is a graphically based approach to presenting research. In presenting your research with a poster, you should aim to use the poster as a means for generating active discussion of the research.
- Limit the text to about one-fourth of the poster space, and use "visuals" (graphs, photographs, schematics, maps, etc.) to tell your "story."
- Utilize the provided WFIRM Summer Scholar poster template (36 " x 48 ")

Design and Layout Specifications

- Your entire poster (use WFIRM Poster Template, size 36" x 48"), will be mounted using push pins on a 40" x 60" foam-core board. Both the foam-core board and easel for display will be provided on site. The board must be oriented in the "landscape" position (long dimension is horizontal).
- A banner displaying your poster title, name, and department (or class, if appropriate) should be positioned at top-center of the board (see Figure 1).
- Make it obvious to the viewer how to progressively view the poster. The poster should read from left to right, and top to bottom. Numbering the individuals' panels or connecting them with arrows is a standard "guidance system" (see Figure 1).
- Leave some open space in the design. An open layout is less tiring to the eye and mind.

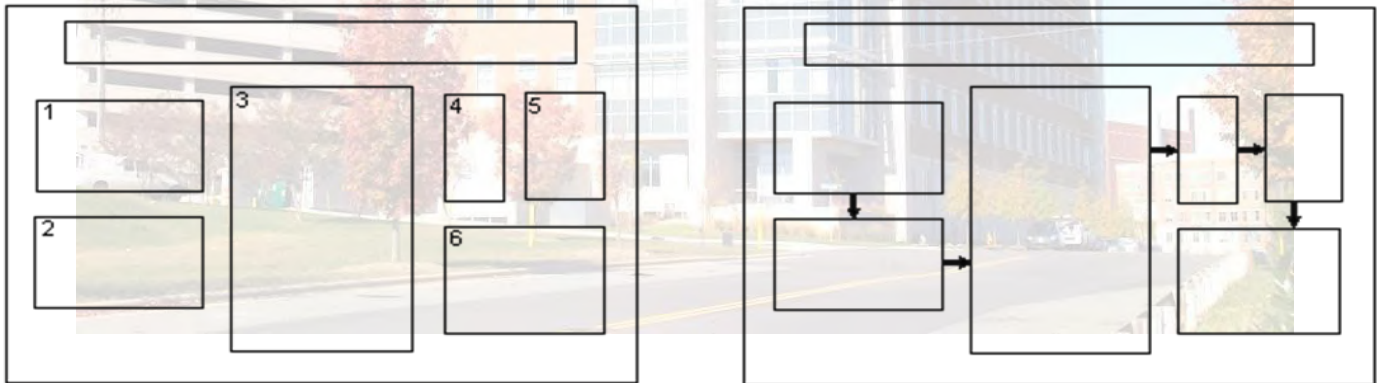


Figure 1: Conventional layouts for a poster. Long panel at top-center is title/author banner. Individual panels can be connected by numbers and arrows. Also, note the use of space between panels to achieve visual appeal. (From: C. W. Connor, 1992, The Poster Session: A Guide for Preparation: U. S. Geological Survey Open-File Report 88-667.)

Lettering

- Word-process all text (including captions). Print on plain white paper with a laser printer or inkjet printer.
- Text should be readable from five feet away. Use a *minimum* font size of 18 points.
- Lettering for the title should be large (at least 70-point font). Use all capital letters for the title.

Visuals

- Present numerical data in the form of graphs, rather than tables (graphs make trends in the data much more evident). If data must be presented in table-form, KEEP IT SIMPLE.
- Visuals should be simple and bold. Leave out or remove any unnecessary details.
- Make sure that any visual can "stand alone" (i.e., graph axes are properly labeled, maps have north arrows and distance scales, symbols are explained, etc.).
- Use color to enhance comprehension, not to decorate the poster. Neatly coloring black-line illustrations with color pencils is entirely acceptable.
- Make sure that the text and the visuals are integrated. Figures should be numbered consecutively according to the order in which they are first mentioned in the text. Each visual should have a *brief* title (for example: Figure 1- Location of study area).

Text

- Keep the text brief. Blocks of text should not exceed three paragraphs (viewers will not bother to read more than that). Use text to (a) introduce the study (what hypothesis was tested or what problem was investigated? why was the study worth doing?), (b) explain visuals and direct viewers' attention to significant data trends and relationships portrayed in the visuals, and (c) state and explain the interpretations that follow from the data. In many cases, conclusions can be summarized in a bullet-point list.
- Depending upon the stage or nature of your project, the text could also include sections on future research plans or questions for discussion with viewers.
- Cite and reference any sources of information other than your own, just as you would do with a research paper. Ask your professor about the particular citation system that you should use (every discipline uses slightly different styles). The "References Cited" is placed at the end of the poster.

Miscellaneous Suggestions

- SIMPLICITY IS THE KEY. Keep to the point, and do not try to cover too many things. Present only enough data to support your conclusions. On the other hand, make sure that you present sufficient data to support your conclusions.
- When you begin to make your poster, first create a list of the visuals that you would use if you were describing your project with *only the visuals*. Write the text *after* you have created the list of visuals.
- Mat the components of the poster on separate pieces of colored poster board. This sets-off the text and illustrations from the white mounting board. Also, you can easily attach each component to the mounting board with pushpins or thumbtacks.
- Before the poster session, rehearse a brief summary of your project. Many viewers will be in a hurry and will want a quick "guided tour" of your poster. Do not be afraid to point out uncertainties in your work; this is where you may get useful feedback.

**Wake Forest University Baptist Medical Center
NON-PATIENT PHOTO RELEASE FORM***

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I hereby irrevocably authorize WFUBMC to edit, alter, copy, exhibit, publish, or distribute this photo for purposes of publicizing WFUBMC or for any other lawful purpose. I waive the right to inspect or approve the finished product, including written or electronic copy, wherein my likeness appears. Additionally, I waive any right to royalties or other compensation arising or related to the use of the photograph.

I hereby hold harmless, release, and forever discharge WFUBMC from all claims, demands, and causes of action which I, my heirs, representatives, executors, administrators, or any other persons acting on my behalf or on behalf of my estate have or may have by reason of this authorization or any use of the photograph.

I am at least 18 years of age and am competent to contract in my own name. I have read this release before signing below and I fully understand the contents, meaning, and impact of this release.

Print Name: _____

Signature: _____ Date: _____

If the person signing is under age 18, there must be consent by a parent or guardian, as follows:

I hereby certify that I am the parent or guardian of _____, named above, and do hereby give my consent without reservation to the foregoing on behalf of this person.

Parent/Guardian Print Name: _____

Parent/Guardian Signature: _____ Date: _____

***NOTE: If photo depicts treatment, payment, or health care, use form MR 08/04, Authorization for Multi-Media Use and Disclosure of Protected Health Information.**