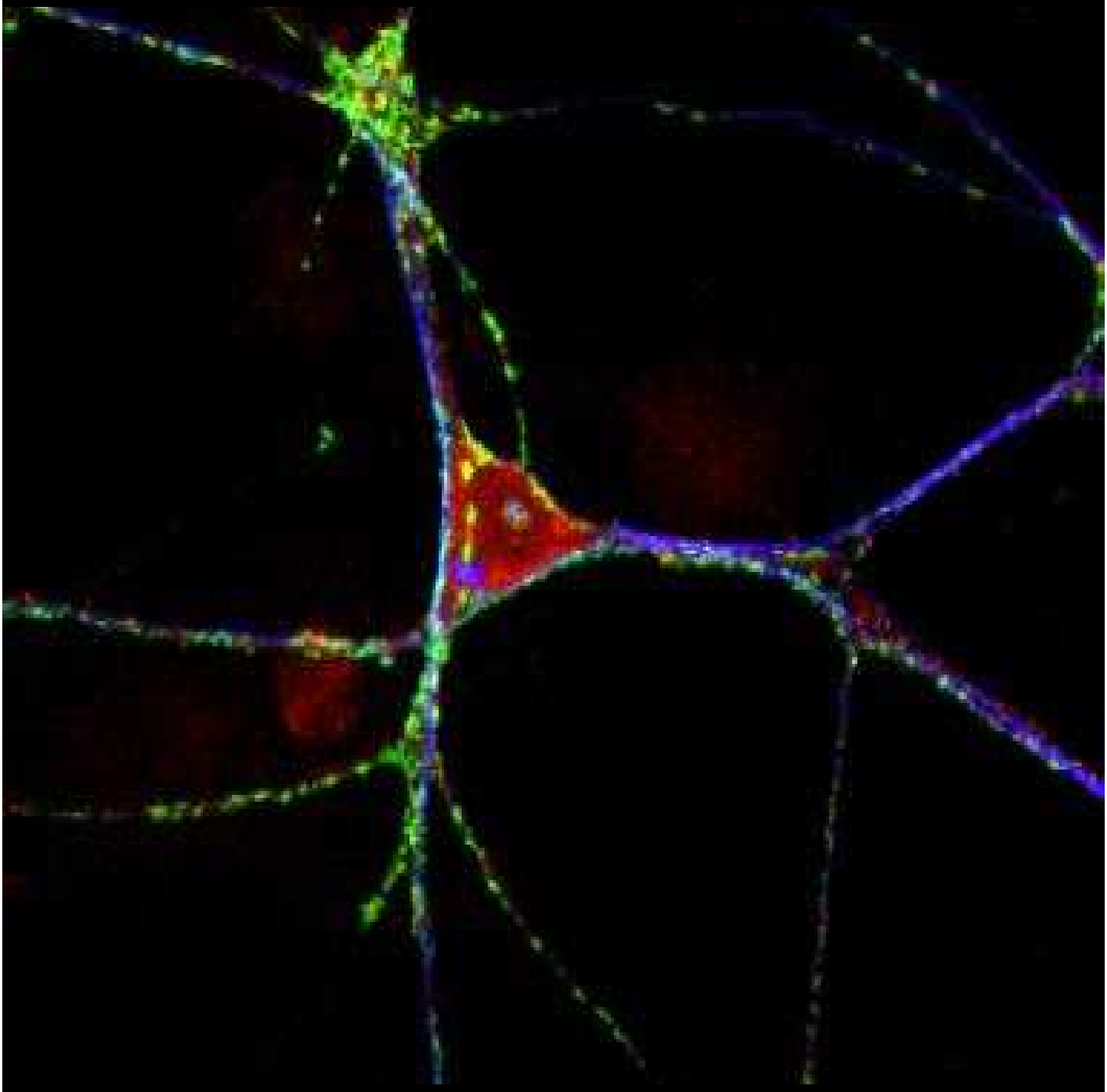
The Synapse Newsletter



Tulane University Neuroscience Association

January/February 2009

Volume 2, Issue 1

January/February 2009

THE SYNAPSE NEWSLETTER

Tulane University Neuroscience Association's Magazine

President's Message David Tien

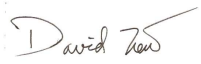
This being my first year being president of TUNA, I would like to say that it has been a pleasure serving you all. Originally, TUNA's mission is to promote our organization through social, academic, volunteer, and speaker events. In the previous years, TUNA has done a great job of fulfilling these objectives. However, this year I would like TUNA to become more prominent on campus and develop better connections with other science organizations.

I am very proud to say that we have accomplished these two new objectives already. If you haven't heard, TUNA, in conjunction with five other science organizations (SECS, SEHS, SWE, BEAST, and Pre-Medical Society), are hosted Tulane's First Annual Snow Day! Furthermore, we have been invited by SECS to co-program with them during Science & Engineering Week in the spring semester. I am very happy that we have created these great bonds among other organizations. I wish that TUNA will continue to maintain and strengthen these bonds in the future, and thrive from it.

As TUNA continues to grow, we hope that you, as member of TUNA, will continue to support us by attending our event and giving us feedback on how we are doing as an organization. Your input, good or bad, will only strengthen TUNA. We greatly appreciate your involvement in TUNA in the previous semesters, and hope to see you more often this semester at our events.

Thank you for all of your support.

Sincerely,



David Tien

President, Tulane University Neuroscience Association

Editors Note

- We welcome you to the first issue of the Tulane University Neuroscience Associations Synapse Newsletter for the 2008-2009 year.
- Our main goal is to publish news-briefs and research experiences of Tulane students in the fields of psychology, biology, and neuroscience.
- Please enjoy this issue, if there are any comments/suggestions contact
- Vijeth Iyengar, Editor, viyengar@tulane.edu

Genetics, Environment, and Dopamine: The Pathway to Schizophrenia Rebecca Morgan

Schizophrenia—the complex brain disorder affecting the thoughts and perceptions of reality amongst a small portion of the population, is likely a result of genetic tendencies for the disease combined with other factors such as the surrounding environment and an increased amount of the neurotransmitter dopamine. The disorder becomes commonly apparent due to symptoms such as paranoid delusions, auditory hallucinations, or disorganized speech and thinking patterns. Schizophrenia is physically caused by "increased dopamine activity in the mesolimbic pathway of the brain." In people affected by schizophrenia, since the disease is so rare, it can be difficult to determine the exact reason behind the disorder. "The illness affects at least 1% of the population worldwide, regardless of race, economic condition, or geographic location. Families who have one member of the family ill with schizophrenia have a greater chance of developing the illness than families who have no relative with this illness." According to the National Institute of Mental Health, genetic predisposition, the external environment, and the increased level of dopamine are the major factors in whether or not a person will be affected by the disorder or not.

"The NIMH genetic studies focus on gathering families' genetic information to better understand what places one family member at risk and conversely, what protects other family members [from becoming susceptible]." Through genotyping, the NIMH has discovered that "at least 60% of the factors that give rise to schizophrenia maybe related to a genetic susceptibility." Studies have been done on identical twins to show that while genetics may not be the sole cause of schizophrenia, , it at least plays a major role in contributing to the overall development of the disorder. For example, you are more likely to develop schizophrenia if a close family member develops the illness themselves (much in the same way of other illnesses such as Type I Diabetes).

Continued on Pg 4 & 5

"A person whose parent has schizophrenia has a ten percent chance of inheriting the condition directly from them." While genetic susceptibility is a prominent cause of schizophrenia, arguments have been made against this factor as the main cause due to the fact that many people develop the illness while having no prior family history of the illness (Table 1). However, it is thought that genetics "makes certain people more susceptible to schizophrenia" and then other factors combine in order to trigger the disorder.

Increased levels of dopamine in the brain as well as stressful environmental factors have also been attributed to combing with genetic susceptibility in order to prompt the onset of schizophrenia. Dopamine is a brain neurotransmitter necessary for relaying brain nerve cell impulses. "Antipsychotic medications, the most common schizophrenia treatment, block the dopamine receptors in the brain.

By blocking the dopamine receptors, antipsychotics limit the amount of dopamine the brain uses." Additionally, "life stressors may trigger schizophrenia in people whose genetics leave them susceptible to the illness." Major life changes such as leaving home, a tragic death, or ending relationships may be linked to the onset of schizophrenia. All three of these factors combined, is the leading belief behind the causes of schizophrenia in modern research.

Differences in the brain structure of a schizophrenic may be noted as well. "Extensive studies have [shown] that many schizophrenics have enlarged brain ventricles (cavities inside the brain containing

Genetic Risks of Developing Schizophrenia

Relationship to patient	Risk
General Population	1%
Aunts, Uncles & Cousins	2%
Nieces, Nephews	4%
Grandchildren	5%
Half Siblings	6%
Parents	10%
Siblings	10%
Children	13%
Fraternal Twins	17%
Identical Twins	40-50%

Table 1

some brain regions have been found to be smaller than average." This being said, not all people diagnosed with schizophrenia have these brain abnormalities, additionally many people who do not show signs of schizophrenia have these similar brain structures (Figure 1).

The development of the illness depends more upon the combination of the three factors as opposed to a diagnosis based solely on one symptom of the illness.

Currently, NIMH, along with other researchers, suggests that there is "no single cause of schizophrenia." Mostly, the genetics behind the disorder tends to be triggered by some other factor within the affected person, causing the illness to surface. Additionally, "many schizophrenia experts believe that schizophrenia is actually more than one disorder, and that [the symptoms] are actually caused by several subtly different mental disorders." Therefore, this makes finding a cause and also a cure quite difficult. Any of the theories for the development of the illness may be true for different varieties of schizophrenia.

References

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Schizophrenia [Schizophrenic Brain vs. Non-Schizophrenic Brain]. Digital image. Lawrence Erlbaum Publishers : Schizophrenic Brain. 2008. 3 Dec. 2008 <http://blausenmedia.com/portfolio/90/346.jpg&imgrefurl=http://blausenmedia.com/portfolio/clients/lawrence-erlbaum-publishers&usg=__lhen7fyeilfi4dd5hwqtbcjva6s=&h=315&w=525&sz=33&hl=en&start=3&tbnid=dzrkpl9l4jivfm:&tbnh=79&tbnw=132&prev=/images%3fq%3dschiz>.

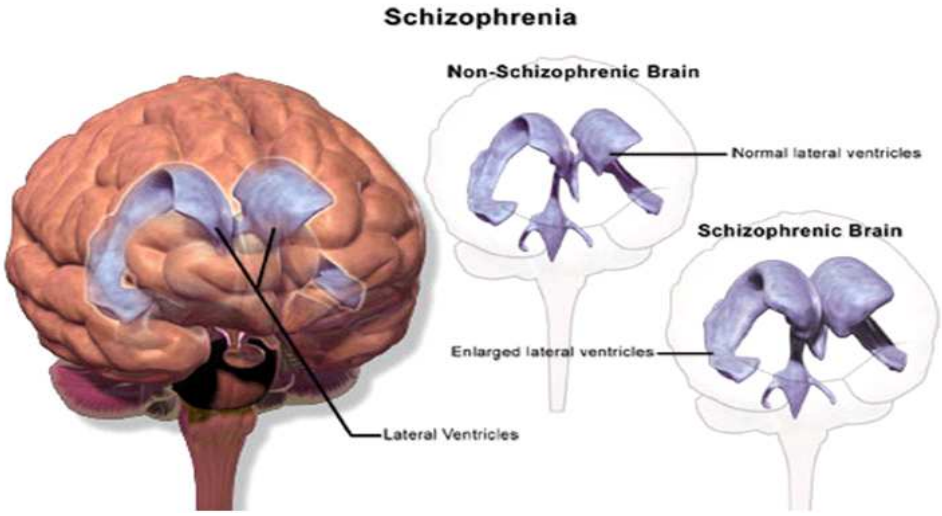


Figure 1

An Exciting Research Opportunity

The Tulane National Primate Research Center is a Tulane University research center in Covington, LA. The primary focus of the center is to conduct basic biomedical research with an emphasis on human health.

The Undergraduate Fellowship Program is offered to pre-baccalaureate students who are currently enrolled in a college-level educational institution and who are interested in biomedical research as a possible career choice. The Undergraduate Fellowship Program entails one-on-one mentored participation in a research project. This is an annual three-month summer program. A small stipend is offered ($9.50 per hour, based on 37.5 hour week, for a maximum of three months). Applications for the program are accepted in the winter of the year preceding the summer start date and the application deadline is March 1 of each year.

The Undergraduate Fellowship Program for pre-baccalaureate students interested in a biomedical research experience will be offered during the months of June, July and August. Positions will be available in each of the following five Divisions of the TNPRC: Bacteriology & Parasitology, Comparative Pathology, Gene Therapy, Immunology, and Microbiology.

Within these divisions, neuroscience-related faculty research includes: AIDS and the blood-brain barrier (Dr. Andrew ("Manus") MacLean), Lyme Disease (Dr. Mario Phillipp), Stem Cells (Dr. Bruce Bunnell), and Primate Behavior (Dr. Kate Baker), AIDS Neuropathogenesis (Dr. Xavier Alvarez). There are currently two neuroscience PhD students at the center.

To be eligible for the Undergraduate Fellowship Program a student must have completed at least one year of undergraduate coursework in biology or a biomedical related field. All applicants must currently be undergraduate or graduate students in good standing and be strongly motivated to participate in on-going research projects at the TNPRC. Participants will have an opportunity to present their research at the End-of-Summer Research Symposium. Candidates interested in applying for this Program should send a letter containing an outline of their career goals, curriculum vitae, a transcript or record of their academic achievements and two letters of recommendation from faculty of their college or university to:

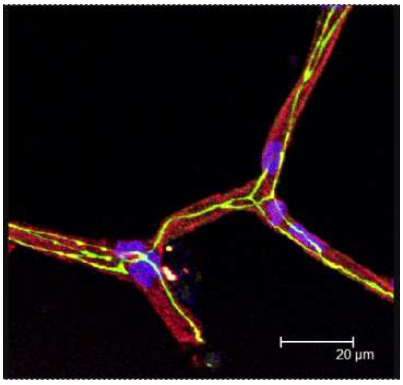
Undergraduate Fellowship Program
Attention: Pyone Aye, DVM, PhD
Tulane National Primate Research Center
18703 Three Rivers Road
Covington, LA 70433
E-mail: paye@tulane.edu

If you are accepted for a fellowship, an informal student carpool is available. Interested parties may contact Nathan Ivey at: nivey@tulane.edu or 434-987-4839.

More information on the TNPRC: http://www.tnprc.tulane.edu/index.shtml

Photo: ***Robin Rodriguez***

Photo: ***Nathan Ivey***



TUNA EBOARD MEMBERS

President: David Tien
dtien@tulane.edu

Vice President: Justin Hohenstein
jhohenst@tulane.edu

Secretary: Anna Tien
atien@tulane.edu

Treasurer: Lien Trinh
ltrinh@tulane.edu

Public Relations Chair: Shelly Gurwara
sgurwara@tulane.edu

Social Chair : Maryam Moghareh
mmoghare@tulane.edu

Outreach Chair: Mona Moghareh
mmoghar@tulane.edu

Synapse Chair: Vijeth Iyengar
viyengar@tulane.edu

Glia Chair: Sarah Lewis
slewis2@tulane.edu

Glia Chair: Jarod Santoro
jsantor@tulane.edu

Tulane University Neuroscience Association (TUNA) was an organization created in order to bring together students in psychology, cell and molecular biology, and neuroscience under one organization.

TUNA intends to serve many purposes (too many to mention!) including:

- Invite speakers to the campus (seminars/discussions)
- Expose the Tulane community (and Greater New Orleans) to neuroscience and issues of the brain
- Expose majors or those interested to possible future careers or educational opportunities in the field
- Let Neuroscience majors meet each other!
- Provide support (academic, social, or other) for the growing number of Neuroscience majors on campus

Spread the word! This club is NOT restricted to just neuroscience majors OR undergraduate students. All students of any major or class/standing are invited

We're on the web:

http://www.neuro.tulane.edu/undergraduate/tuna.php

Research Opportunities

We, TUNA, are well aware that many of our club members and readers are pre-med students with aspirations either to go to medical school or graduate school.

To facilitate this we are beginning to compile a list of research and career oriented internships that may be useful to you.

The following websites provide with a list of research and career oriented internships:

http://www.yale.edu/necuse/

http://www.rit.edu/%7Egtfsbi/Symp/cstate4.htm

http://www.training.nih.gov/student/sip/index.asp

http://www.neurobiology.uab.edu/spin03.htm

http://molbio.grad.uiowa.edu/applicants/summerapp.asp

http://www.neurosci.louisville.edu/students-info/undergrad.html

http://www.ninds.nih.gov/jobs_and_training/summer/

http://www.hms.harvard.edu/nerprc/summer.html

http://cpn.umc.edu/education/nssp/nssp.html

http://www2.umdnj.edu/neuroweb/summer_prog/

http://www.cns.nyu.edu/undergrad/surp/

http://www.cvs.rochester.edu:591/fellowship/ug_fellowapp.html

http://cellbiology.uc.edu/surp/index.php

http://cnup.neurobio.pitt.edu/undergraduate.cfm

http://www.uvm.edu/~annb/?Page=summerfellowships.html

There is also a new summer program in several of the nation's top universities called the Amgen Research Scholar Program. Please visit this website for more information:

http://www.amgenscholars.com/

Tulane University Neuroscience Association

A sample of the Cell and Molecular Biology Faculty:

Dr. James Cronin cronin@tulane.edu

Dr. Robert Dotson rdotson@tulane.edu

Dr. Fiona Inglis inglis@tulane.edu

Dr. Laura Schrader schrader@tulane.edu

Dr. Jeffrey Tasker tasker@tulane.edu

http://cell.tulane.edu

A sample of the Department of Psychology Faculty:

Dr. Terry Christenson tchris@tulane.edu

Dr. Jill Daniel jmdaniel@tulane.edu

Dr. Gary Dohanich dohanich@tulane.edu

Newly Formed TUNA Committee for 2009!

Congratulations to the following individuals who are your newly elected TUNA Committee Members for Spring 2009:

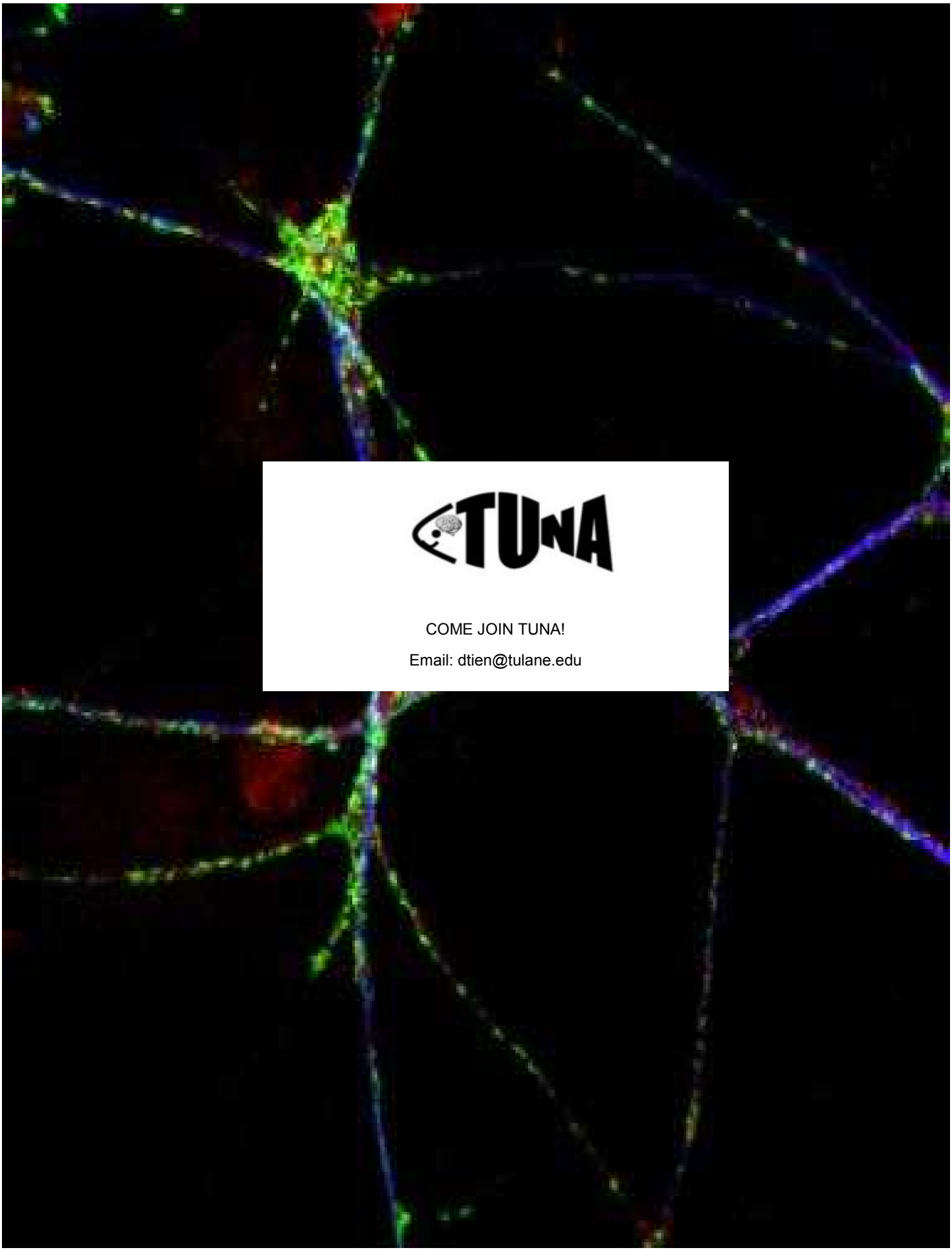
Alexander Evins **Amanda Bradley**
aevins@tulane.edu abradley@tulane.edu

Audrey Bowes **Carol Woods**
abowes@tulane.edu cwoods2@tulane.edu

Claudia Osornio **Marco Elegante**
corornio@tulane.edu melegant@tulane.edu

Sopan Mohnot **Sunil Mitta**
smohnot1@tulane.edu smitta@tulane.edu

Terra White **Venna Varki**
twhite2@tulane.edu vvarki@tulane.edu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