

Name	Rabin Kadariya
Laboratory	Wildlife Biology and Medicine
Year (Grade)	2015 (3rd grade)
Internship institution	Smithsonian Conservation Biology Institute Center for Conservation Genomics
Internship period	Internship period: 01/07/2018 - 02/06/2018 (Departure Date from Sapporo: 01/07/2018, Arrival Date in Sapporo:02/07/2018)
Purpose	Establishment of collaboration with Center for Conservation Genomics (CCG) for the future wildlife genetics work in Nepal



The reason why you chose this institute

Center for Conservation Genomics researchers specialize in genetic management of wildlife, genomics, non-invasive DNA, ancient DNA, genetic service to the zoo community, and applications of genetic methods to animal behavior and ecology. It has good collaboration/partnership worldwide with different agencies. The Smithsonian Conservation Biology Institute initiated tiger ecology projects using radio telemetry during 1980s in Nepal and continue some training program. I am particularly interested to develop connections with SCBI scientists for the joint establishment of genetic lab in future.

Result of the activity

Orientation/talk: In first day of visit in the Center for Conservation Genomics (CCG), my mentor Robert C. Fleischer, senior scientist and center head, introduced me Susan Phillips, management support specialist and Jesus E. Maldonado, research geneticist. Susan facilitated me for administration process in Smithsonian Conservation Biology Institute (SCBI). She also showed me nice Amazon forest which was in Zoo near our center. Next day, I had meeting with Rob and Jesus to finalize my itinerary during my staying in USA and exciting discussion on future collaboration for the wildlife genetic study in Nepal. Initially, Rob wanted me to include in microsatellite analysis of tiger feces which was collected from Bangladesh but due to some political issues with this project, it could not work further. Both had decided to involve me in some ongoing research work, conference, trainings, lab meetings and interaction with other scientists in SCBI. The SCBI has six centers at the National Zoo including CCG, center for animal care science, conservation ecology center, migratory bird center (MBC), center for species survival and center for conservation education and sustainability. They were very excited to revive the historical relationships (Photo 1) of SCBI and my organization National Trust for Nature Conservation (NTNC) with new wildlife genetics study. Jesus made me a short visit and orientation on CCG main genetic lab (Photo 2). The facilities had two sections, one for the DNA extraction and store of field sample, and another section for PCR and genetic processing. Beyond, he also showed me ancient DNA lab. I met Nancy Rotzel McInerney, laboratory manager, who later trained me on some analytical machine. The scientists of CCG also advise graduate and postdoctoral fellows that come through Smithsonian institution fellowships and it was nice moments working with these students and post-doctoral fellows. At this moment, the center has 6 staffs and more than 13 postdoctoral fellows and students. An office room had provided me where I had very friendly roommate Alex E. Jahn, post-doctoral fellow in migratory bird center who was working on migratory bird in Brazil. It was nice to learn on bird research using GPS telemetry. I felt happy to make his connection with some ornithologists from Nepal for the future collaboration. I had regular interaction with staffs of CCG, migratory bird center and conservation ecology center during lunch, coffee and conference break. I had easy access to Jesus office at any time to share our ideas and discussion about future genetic work in Nepal. He recommended me to apply joint proposal in United States Fish and Wildlife Service (USFWS) and Peer Partnerships for Enhanced Engagement in Research (PEER) grant in USAID.

Meetings/seminars: I also participated in weekly lab meetings and journal club discussions which were organizing in every Tuesday at 12:00 pm, during lunch time. In the meeting, post-doctoral fellows and students were shared their progress, future plan and encountered problems on their experiment. The scientist tried to solve the problem, introduced new protocol of lab or any lab instructions for the sophisticated use of lab by all members. I joined the presentation (Photo 3) on protocols for ancient lab, and diversity and evolutionary history of Neotropical squirrels made by Nancy and Silvia E. Pavan, post-doctoral fellow respectively. I also got an opportunity to present my research progress where very fruitful and constructive comments were received (Photo 4). I regularly participated in the seminar series organized by SCBI with the invitation of renowned scientist mostly from USA universities and research institutions. A social hour (Photo 5) was followed the presentation where I talked with presenter (Heidi Fisher, Department of Biology, University of Meriland; Mario Pesendorfer, Cornell Lab of Ornithology, Henrik Rasmussen, Saavannah Tracking Ltd, Save the Elephants), post-doctoral fellows, students and SCBI scientists on their research topic and possible future collaboration. Beside I also attended in biannual all staffs meeting of National Zoo, welcome and farewell program as a visitor guest. I had wonderful time with Mahendra Shrestha, program director of tiger conservation partnership who served Department of National Park and Wildlife Conservation in Nepal for more than 15 years before joining to SCBI. He showed keen interest for my future work on wildlife genetics in Nepal and wanted to involve in the lab development process. He also organized meeting with some Nepalese conservationists (Subash Lohani, Deputy Director for the Eastern Himalaya Ecoregion program, WWF–US, Bajimaya Shrestha, former Directorial General, DNPWC, Hemanta Raj Mishra, renowned wildlife conservationist, Kumar Upadhaya, former consultant of FAO) who were available in USA, for the seeking of their support on wildlife conservation endeavors.

Lab practice: I partially involved in the lab experiment with Carly R. Muletz Wolz (Photo 6), Robert and Arlene Kogod Secretarial Scholar and Silvia (Photo 7), a post doctor fellow on their projects. Carly was working on dietary analysis of rats from Hawaii by using biomarkers and Siliva was working on diversity and evolutionary history of Neotropical squirrels. Beside I had a wonderful time with Jesus and Jessica Quinta, a university student to know microsatellite genotyping of fox using GeneMapper software (Photo 8). Carly's connection was made with Nepalese herpetologist, Santosh Bhattarai as she is particularly interested in swabbing frogs and

salamanders from Nepal for disease testing. She is recently planning for field work after securing of fund.

Training: The SCBI is really the best place to aware new techniques on wildlife genetics from the students, visiting scholar, postdoctoral fellows and scientists. A training program on Maximum likelihood analysis using RAxML and Bayesian interference using MrBayes were organized by Mirian Tsuchiya, post-doctoral fellow and Edson Fiedler de Abreu Júnior, PhD student (Photo 9) respectively. I also attended in the training on R program (Photo 10) which was organized by Brian S. Evan, migratory bird specialist, migratory bird center but could not complete all package due to my departure time in Japan.

Others visit: I had a short visit in Smithsonian National Zoological park (Photo 11) to see the management of animals in Zoo, Smithsonian national museum of natural history (Photo 12) to familiar with world biodiversity and Shenandoah national park to familiar with American black bears and its habitats during weekends. The zoo visit was very nostalgic for me where animals like elephant, sloth bear, cats and otters were displayed which I worked for conservation before joining in university. The museum was very big than I expected where artifacts of animal from all over the world were nicely displayed.

What do you think the positive impact of activity will have on your further career path?

During my field experiences, I realized that my knowledge needs to be upgraded for genetic study, which is non-invasive to wildlife and can get ample of information about wildlife biology. My interest on wildlife genetics brought me for PhD program at laboratory of Wildlife Biology and Medicine, Hokkaido University, Japan and on internship program at Center for Conservation Genomics, SCBI, USA. In Nepal, nobody is concerning on mountain species especially Asiatic black bear whereas these species are being killed as retaliation due to growing human bear conflict. Now I am doing research on genetic diversity and phylogeny of Asiatic black bears by using non-invasive DNA techniques from Annapurna Conservation Area of Nepal. My internship in Center for Conservation Genomics is very helpful to upgrade my existing knowledge on microsatellite and mitochondrial DNA analysis too. I also learned some genetic experiments, use of machine and analysis of results by using different software. Besides, I am familiar with daily routine of independent lab, mobilizing university students and other administration process. It also provides me a great opportunity to have a link

with biologist who are working all over the world. The head of Center of Conservation Genomics and other scientists are very interested to develop collaboration for the future genetic work in Nepal. we are planning to apply joint proposal in USFWS and PEER grant of USAID for the wildlife genetics study in Nepal. Some facilities such as PCR has already established in Nepal and searching fund for the setting of genetic analyzer so that we can organize noninvasive study of endangered wildlife species. We are planning to mobilize university students for the research work in near future. Mahendra Shrestha, program director, Tigre conservation partnership of SCBI is also very interested to organize the genetic study of tiger in collaboration with Tiger conservation program and Center for Conservation Genomics of SCBI, NTNC and governmental institution of Nepal. It developed my strong confident to establish wildlife genetic work in Nepal for the long-term conservation of remaining wildlife. The achievement from internship and PhD program will certainly help to promote my existing position in my office.

Advice for your junior fellows

I would like to suggest for the timely searching of host organization where you would like to do internship because it may take long time for getting final offer letter and visa application process. It would be very useful if you are familiar with different visa category and documents required for the category especially for USA travel, otherwise you need to apply again with proper documents. If you want to learn new techniques or involve in most of the research steps, it is better to manage your time for more than one month. One month period including travel and regular holidays is quite short to engage in all research steps whereas you have wonderful time to visit lab, observe ongoing research work, interaction with team and sharing your ideas. It is a golden opportunity to visit new lab of different country, meet new people with diversified expertise and the most beauty is secure of fund from leading program, so do not miss this chance to visit your best dream organization/lab in the world.

Approval of supervisor	Institution • Official title • Name Lab. Wildlife Biology and Medicine, Professor, Toshio Tsubota
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- ※1 Send the electronic file to the Leading School section, International Affairs Office
- ※2 Attach a copy certificate of the content of internship activity that is prepared by the counterpart at the internship institution (any form with a signature of the counterpart): **Sealed envelope was delivered to the leading program office**
- ※3 The Steering Committee of the Leading Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.

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Photographs



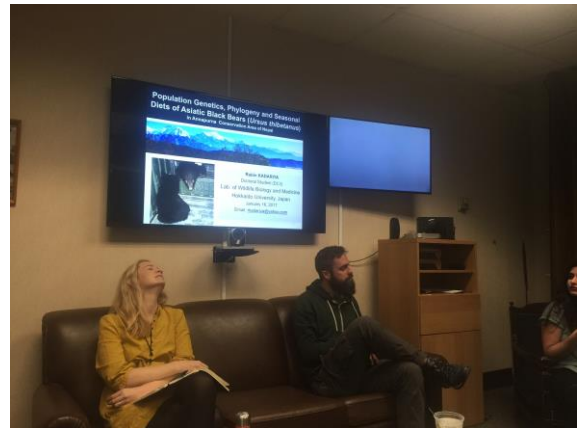
1. Lab shown by Dr. Jesus



2. Historical portrait of Smithsonian's tiger conservation work in Nepal



3. Regular lab meeting



4. My presentation at SCBI



5. Social party after conference



6. DNA extraction of rat feces with Carly



7. DNA measurement of Squirrel sample from south America with Silvia



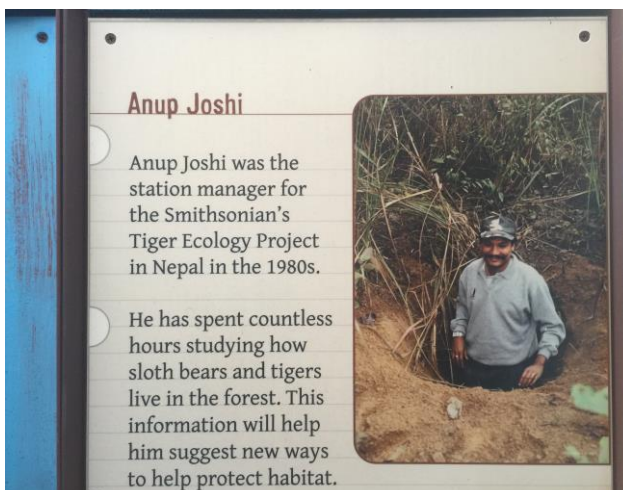
8. Discussion on analyzing of microsatellite genotyping with Jesus



9. Training on R program



10. Edson, a PhD fellow who trained me some software



11. Information about sloth bear work from Nepal in sloth bear section of Zoo



12. Display of African elephant artifact in national museum of natural history