

Budget justification

Enabling Calibrations of Machine Learning Approaches (ECMLA)
Walter Hopkins, Assistant Physicist

A Senior/Key Person

The PI is the only senior person that will be funded. The PI will be funded at an average of 0.50 FTE. Table 1 shows the breakdown of the PIs FTE for each budget period.

Table 1: Effort costs for each period. Indirect costs are not included.

Senior (PI)					Postdoctoral			
	Months	Salary	Fringe	Total	Months	Salary	Fringe	Total
Period 1	9.0	\$136,246	\$40,874	\$177,120	12.5	\$77,778	\$19,055	\$96,833
Period 2	7.0	\$122,733	\$36,820	\$159,553	18.0	\$116,541	\$28,553	\$145,094
Period 3	6.0	\$108,992	\$32,698	\$141,690	29.5	\$198,431	\$48,615	\$247,046
Period 4	6.0	\$112,924	\$33,877	\$146,801	17.0	\$118,806	\$29,108	\$147,914
Period 5	6.0	\$117,002	\$35,100	\$152,102	12.0	\$87,132	\$21,347	\$108,479
Total	34.0	\$597,897	\$179,369	\$777,266	89.0	\$598,688	\$146,678	\$745,366

B Other Personnel

Other personnel will include an average of 2.0 FTE of postdocs. Two postdocs, each at 1.0 FTE, will be hired at the beginning the first budget period. The contract of the postdoc will end at the end of the fourth and beginning of the last budget period. Table 1 shows the breakdown of the postdoc FTEs for each budget period. Funding for graduate students is not included in the proposed budget because laboratories typically do not fund graduate students. However, the PI will collaborate with local universities through the ATLAS Center and work with students through DOE Office of Science Graduate Student Research and the Science Undergraduate Laboratory Internship programs.

C Equipment

The requested equipment consists of two laptops for the two postdocs that will be funded for the proposed work and is expected to have a total cost of \$7,360.

D Travel

Travel will mainly consist of trips to CERN for the PI and postdocs. Based on previous experience, travel to CERN costs \$3000 per trip. About two trips per year and per person will be made to CERN. These trips will be to attend the ATLAS Physics, Machine Learning Forum, and E/gamma meetings which are held multiple times a year. The Physics meetings are essential in communicating with ATLAS collaborators.

In addition to trips to CERN, three domestic trips to conferences to highlight results are foreseen every two years. Based on previous experience, these trips cost \$1500. Table 2 shows the breakdown of travel costs for each budget period. **NEEDS UPDATING** Examples conferences where new physics search results can be shown are SUSY or ICHEP. These are international conferences that can occur anywhere in the world but the ones that will be domestic will be chosen. For the detector simulation work, conferences such as CHEP and ACAT will be considered. These trips are planned for budget period two, three and four. Budget period two will include one trip for the PI and one for the 0.5 FTE ATLAS postdoc to highlight the early detector simulation results based on simplified geometries. Budget period three will include one trip for the PI and two trips for the two postdoc that were hired to focus on the proposed work. These trips will be to show the results of the pMSSM interpretation and detector simulations with more complex geometries. Finally, budget period five will include one trip for the PI, one for the 1.0 FTE postdoc, and one for the 0.5 FTE ATLAS postdoc. These trips are meant to share the results of the completed new physics search and early ATLAS simulation results.

Table 2: Travel budget and trips per period. Indirect costs are not included.

	Domestic trips	International trips	Travel Funds
Budget period 1	0	2	\$6,000
Budget period 2	2	5	\$18,000
Budget period 3	3	6	\$22,500
Budget period 4	0	7	\$21,000
Budget period 5	3	5	\$19,500
Total	8	25	\$86,500

E Participant/Trainee Support Costs

Not applicable.

F Other Direct Costs

There are no other direct costs other than the personnel, equipment, and travel costs listed above.

G Direct Costs

The total direct costs are \$1,615,156 of which \$1,522,632 is in salaries for the PI and postdocs, \$8,524 is for equipment, and \$84,000 is for travel.

H Other Indirect Costs

Argonne uses several indirect rates and basis for distribution of indirect expenses. The different indirect rates for FY2024 and beyond are shown in Table 3. The total indirect costs, which depend on the mix of costs from various expense categories, per budget period are shown in Table 4 and come to a combined total rate of 50% . Not considering LDRD, the total indirect rate for effort is 50.9% while the rate for equipment and travel is 20.8% for all budget periods NEEDS TO UPDATED. In addition to these indirect rates that are applied to direct costs, an LDRD indirect cost is added but is applied to the total cost (direct+non-LDRD indirect costs).

Table 3: Indirect cost rates for different expense categories.

	FY2023 rate	Applied to
Common Support	33.4%	Effort and other non-M&S costs
IGPP/IGPE	1.1%	Effort and other non-M&S costs
M&S	6.4%	Materials and services
General and Admin	7.2%	All direct costs
Physical Sciences and Engineering ALD	4.6%	All direct costs
LDRD	3.7%	All costs (direct and non-LDRD indirect)

I Total Direct and Indirect Costs

The total cost of this proposal is \$2,749,999. The direct, indirect, and total cost per budget period can be found in Table 4.

Table 4: Direct and indirect costs per budget period.

	Direct costs	Indirect costs	Total cost
Budget period 1	\$283,899	\$139,873	\$423,772
Budget period 2	\$301,785	\$152,000	\$453,785
Budget period 3	\$408,103	\$206,118	\$614,221
Budget period 4	\$370,579	\$186,990	\$557,569
Budget period 5	\$299,422	\$151,231	\$450,653
Total	\$1,663,788	\$836,212	\$2,500,000