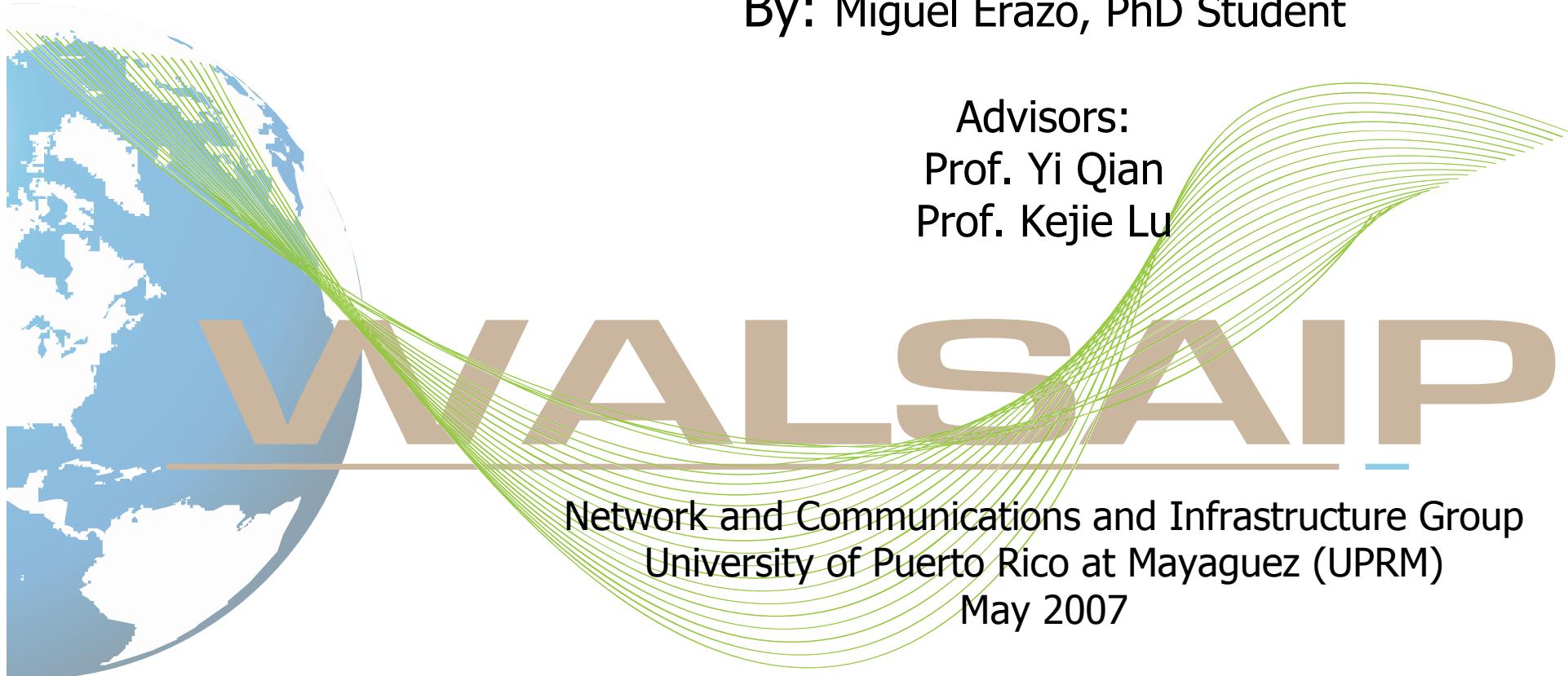


# Analysis and Design of a MAC protocol for Wireless Sensor Networks with Periodic Monitoring Applications

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# Problem formulation

How to efficiently manage scarce energy resources in WSN  
for wide area large scale environmental monitoring applications.

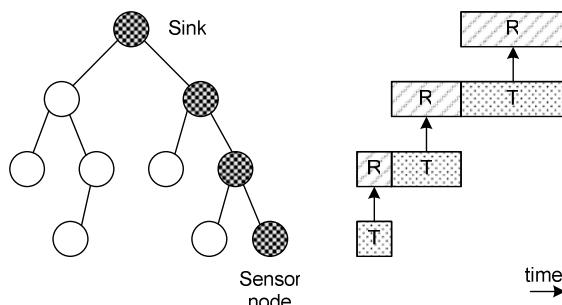


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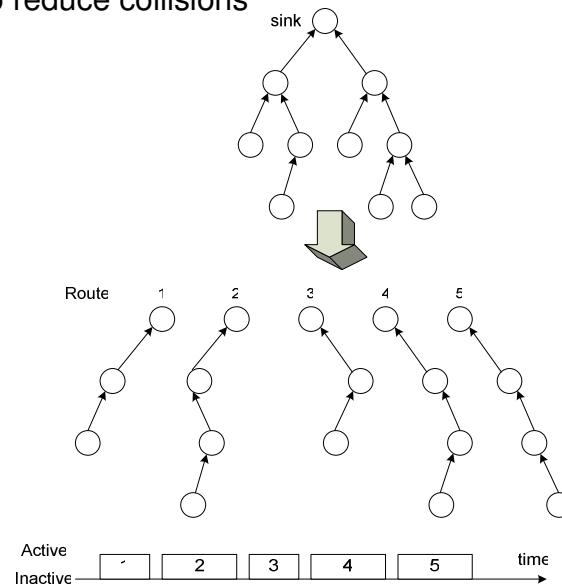


# Methodology

## A. Proposed Time Schedule



## B. Route Partition mechanism proposed to reduce collisions



## C. Algorithm to find a subset of paths to be disseminated through RDP packets

```

Create used                                //object of a data structure
Create subpaths                             //object of a data structure
for i=1 to N                                //for all original paths
    if(used.find(Ri)!=1){                   //path has not been used
        subpaths = findSubpaths(Ri, R)          //find subpaths
        R'.add(Ri)                           //route is added to R'
        used.add(Ri)                          //path has been used and now can be discarded for future use
    for j=1 to sizeof(subpaths)
        used.add(subpaths .returnNextSubpath)      //discard subpaths for future use
    }

findSubpaths(Ri, R){
    Create subpaths
    for j=1 to N
        if|R.Rj| < |R.Ri)                  //possible subpath
            for k=1 to R.Rj
                equalElements = 0
                for l=1 to R.Ri
                    if rk,l == rl,i
                        equalElements = 1
                if(equalElements ==0)
                    goto label 1
                subpaths.insert(R.Rj)
            label 1
            return subpaths
}

```

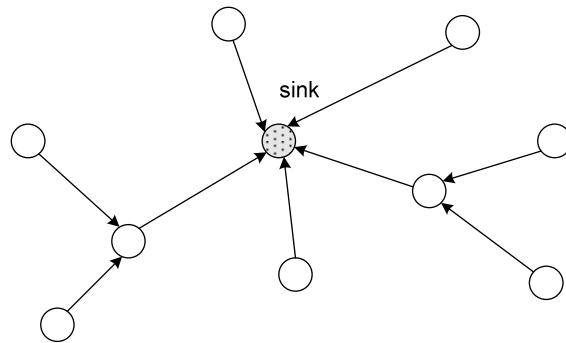


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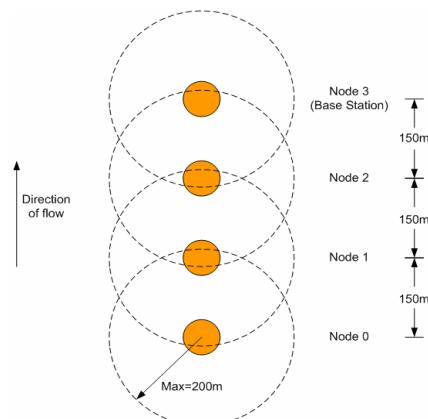


# Application Tools

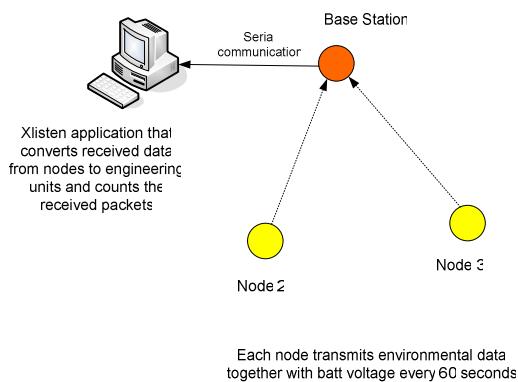
## Network configuration for simulations using ns-2



Network configuration used in simulation using ns-2 for previous work (SEA-MAC)



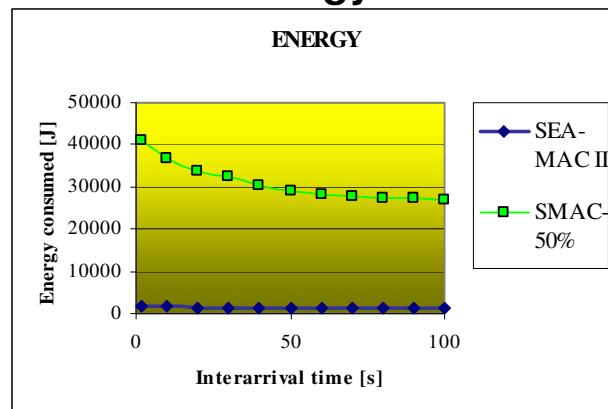
Network configuration used in implementations in mica2 motes for previous work (SEA-MAC)



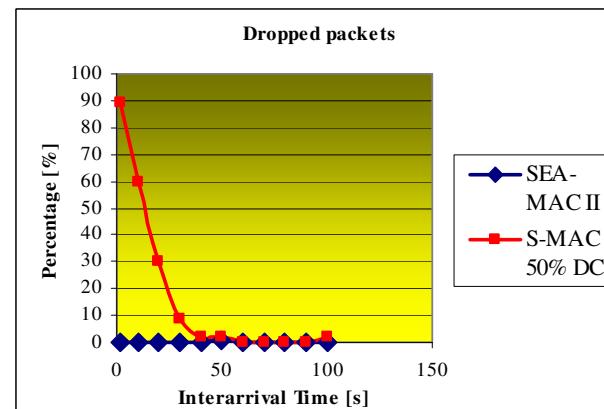
# Research Results

## Protocols SEA-MAC II and S-MAC

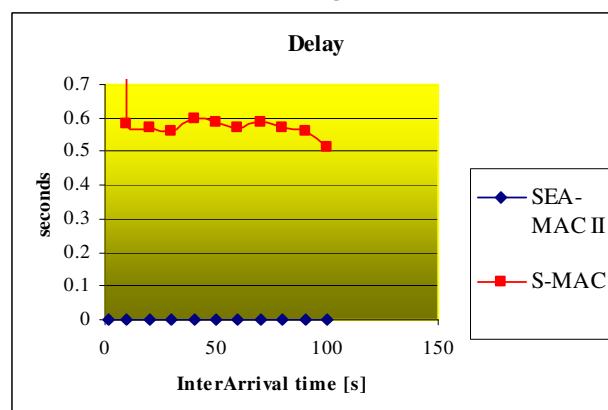
### Energy



### Packet Loss



### Delay



### Publications:

M. Erazo, Y. Qian, "SEA-MAC: Simple Energy Aware MAC Protocol for Wireless Sensor Networks for Environmental Monitoring", Proceedings of ISWPC'2007, San Juan, PR, February 2007.



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